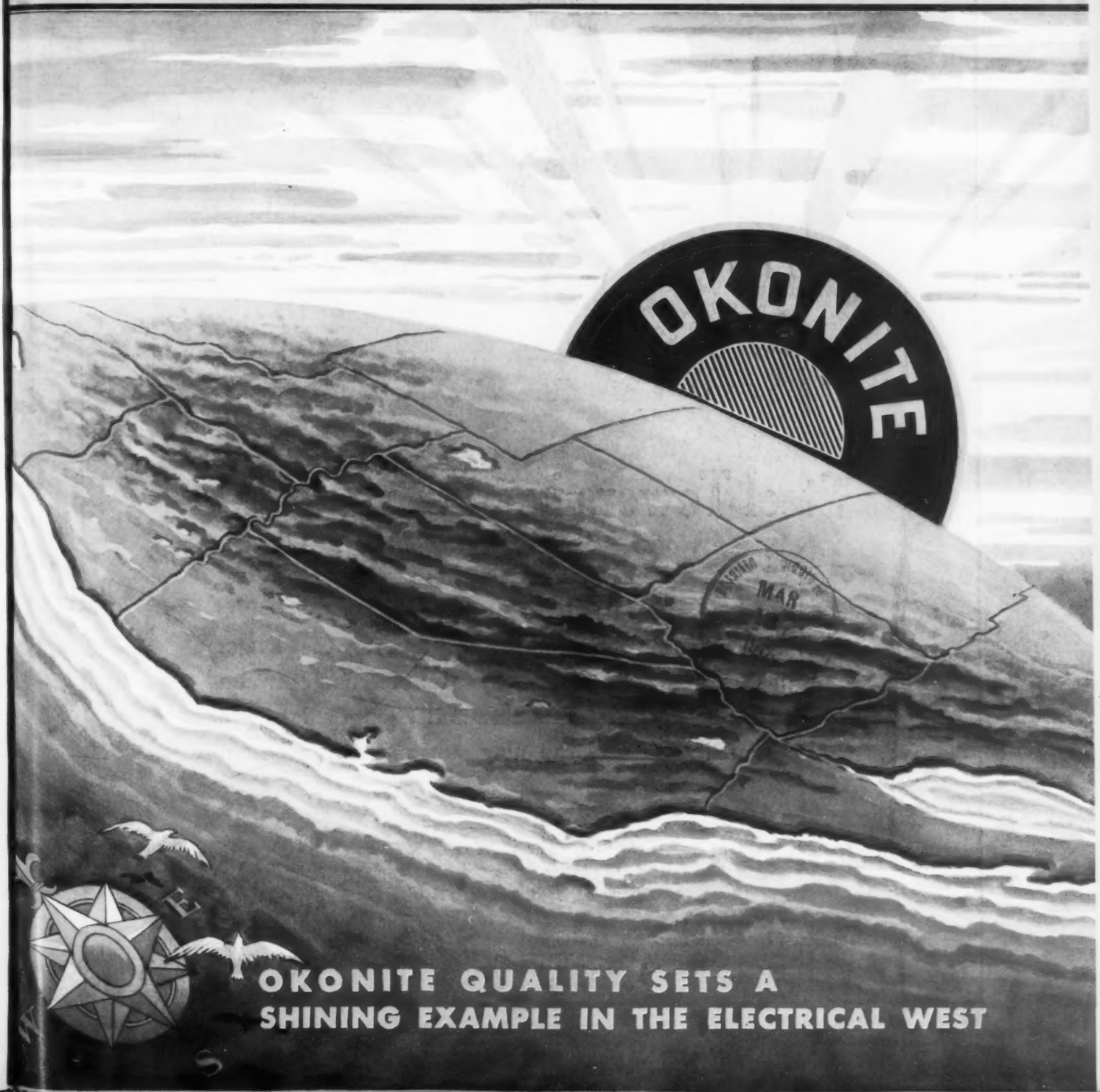
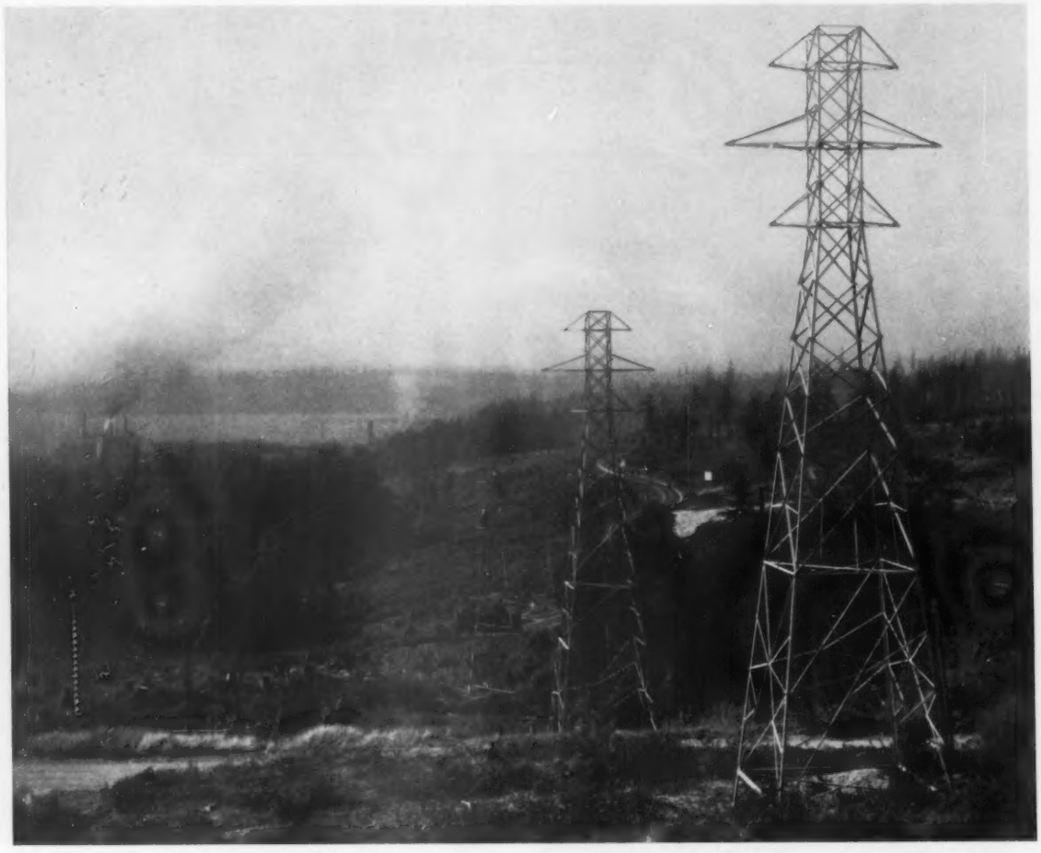
Electrical West

With which is consolidated the Journal of Electricity

A McGRAW-HILL PUBLICATION March 1, 1930 TWENTY-FIVE CENTS PER COPY





Steel Towers in the Northwest

PERMANENCE and dependability were of first consideration in the design of this 60 kv. transmission line, built by Stone and Webster for the Puget Sound Power and Light Co., Seattle. It runs between the recently completed Shuffleton Steam Plant on Lake Washington and the new substation at Renton.

PACIFIC COAST STEEL CORPORATION

Subsidiary of Bethlehem Steel Corp.

Sales Offices
Seattle, Portland, San Francisco, Los Angeles

Plants
Seattle, San Francisco, Los Angeles

General Office: Matson Bldg., San Francisco

ELECTRICAL WEST, entered as second class matter at the post office at San Francisco, under the Act of Congress, March 3, 1879. Published at 883 Mission Street, San Francisco, California, thirteen times a year as follows: January 1, February 1, March 1, April 1, May 1, May 15, June 1, July 1, August 1, September 1, October 1, November 1, and December 1.

G. C. TENNEY, *Editor*
W. A. CYR, *Associate Editor*
G. R. HENNINGER, *Associate Editor*

D. D. PEEDE, *News Editor*
B. H. SNOW, *Northwest Editor*
C. T. HUTCHINSON, *Publishing Director*

Electrical West

With which are consolidated the "Electrical Journal," the "Journal of Electricity, Power & Gas," and the "Journal of Electricity"
A McGraw-Hill Publication
Established 1887

Volume 64 | San Francisco, March 1, 1930 | Number 3

McGraw-Hill Company of California

883 Mission Street
SAN FRANCISCO

NORTHWEST OFFICE
1206 Spalding Building
PORTLAND, OREGON

SOUTHWEST OFFICE
632 Chamber of Commerce Bldg.,
LOS ANGELES, CALIF.

Publishers of
ELECTRICAL WEST

JAMES H. MCGRAW, *Chairman of the Board*
C. T. HUTCHINSON, *President*
EDGAR KOBAK, *Vice-President*
NATHAN A. BOWERS, *Vice-President*
GEORGE C. TENNEY, *Secretary and Treasurer*

WASHINGTON, Colorado Building
CHICAGO, 520 North Michigan Avenue
PHILADELPHIA, 1600 Arch Street
BOSTON, 1427 Statler Building
CLEVELAND, 501 Guardian Building
ST. LOUIS, 1556 Bell Telephone Building
NEW YORK, 285 Madison Avenue
DALLAS, 303 Thomas Building
DETROIT, 2-257 General Motors Bldg.
GREENVILLE, S. C., 1301 Woodside Bldg.

Subscription rate in the United States and possessions, Canada, Mexico and all countries included in the U. S. Postal Union. $2 per year, two years $3; elsewhere $3 gold (13 shillings), two years $5. Single copy, 25 cents. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Member Audit Bureau of Circulations
Associated Business Papers, Inc.

Circulation of this issue, 6,350

Copyright 1930 by
McGraw-Hill Company of California

Contents

Standby Steam Plant Designed for Instantaneous Load Pick-up 117

By HAROLD K. FOX and J. M. RENFREW.

A detailed description of the new San Francisco steam plant of the Great Western Power Company of California by two of the engineers responsible for its design and construction.

The Dude Desert 123

By JAMES G. NUSBAUM.

Light for Night Flying 126

Some Recently Developed Western Airports.

Automatic Hydro-electric Plant Proves Its Economies 128

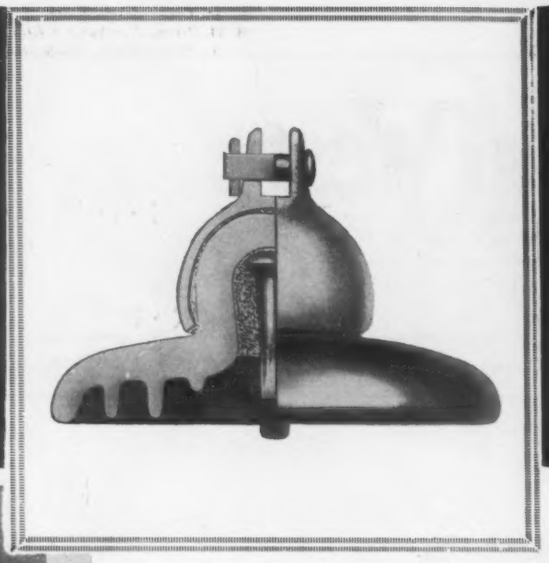
By C. W. COLVIN.

Summary of a year's operation which testifies to the success of the fully-automatic Alouette plant of the British Columbia Electric Railway Company.

Idaho Power Company Develops Farm Water Heater 129

By L. W. BRAINARD.

Editorial 130
Engineering Practice 132
Ideas for the Contractor 138
Motor Forum 144
Better Merchandising 146
News of the Industry 152
Meetings 160
Personals 161
Contractors, Dealers and Inspectors 163
Manufacturer and Distributor 165
New Equipment 167
Industrial Barometer 170



Standard suspension unit No. 2300. Test voltage 112,000; Minimum Mechanical and M & E strength, 12,000 lbs. Note unique construction features to prevent failure, more fully explained below.

LAPP INSULATORS

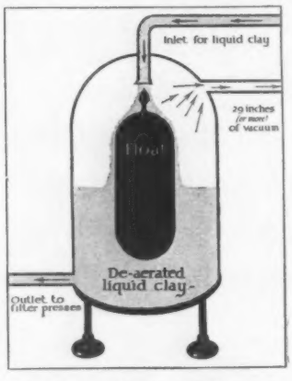
No Wonder They Endure

INSULATORS *can* be produced to withstand unusually severe conditions indefinitely—from ordinary daily hazards up to dirt and salt spray. They are being produced right now—by Lapp. Here's how Lapp avoids the usual causes of failure:

1—Those head cracks almost invariably start at or near a corner, due to unequal shrinking. Hence—no corners, no cracks. Lapp Insulators avoid corners by using broad curves.

2—Ordinary wedge-shaped eye-bolt buttons contract when chilled, sinking deeper into their "nest." Then, expanding, they tend to split the sides of the nest apart. Lapp buttons have the load-carrying ledge at a 45° angle. Even extreme temperature changes can't produce wedging. And, as for expansion—

3—Lapp Insulators are cemented in moist steam — well above the usual atmospheric range; thereby an unusually large space is provided for re-expansion of eye-bolt buttons.



Here's how the Lapp Vacuum Process acts

4—All metal surfaces adjoining cement are coated with a special paint to facilitate easy movement during expansion and contraction.

5—To avoid cascading, Lapp Insulator caps are smooth outside—free from ridges and points.

6—Caps are made of drop-forged copper-bearing steel.

7—All porcelain is Vacuum Process—see diagram. Porcelain troubles (internal) are due largely to air bubbles derived from the water and operations of mixing. The Vacuum Process removes the air—and the trouble.

Yet Lapp Insulators cost no more, so you're already paying for Lapp superiorities. Why not get them?

Pacific Coast Representatives—S. Herbert Lanyon, 210 Transportation Bldg., Los Angeles, Calif.; 500 New Call Bldg., San Francisco, Calif.; W. R. Hendrey Co., Hoge Bldg., Seattle, Wash.

LAPP INSULATOR CO. INC. LEROY·N.Y.·U.S.A.

©CIB 63698
MAR 13 1930

Electrical West

G. C. TENNEY, *Editor*

With which is consolidated the Journal of Electricity
A McGraw-Hill Publication

C. T. HUTCHINSON, *Publishing Director*

Volume 64 | San Francisco, March 1, 1930 | Number 3

Standby Steam Plant

Designed for Instantaneous Load Pick-up

By HAROLD K. FOX[1] AND J. M. RENFREW[2]

UNIQUE upon at least two counts is the San Francisco steam plant of the Great Western Power Company of California. In the first place, the 43,750-kva. main generating unit is designed to run normally as a synchronous condenser and to pick up full load practically instantaneously upon the occasion of any system emergency. In the second place, all of the electrically driven auxiliary equipment throughout the plant normally operates from the system through the 2,500-kva., 11.5/2.3-kv. station service transformer bank, but in the case of a system emergency is thrown automatically upon the 2,500-kva. house turbine-generator unit. Related automatic features together with the special design of boilers and other equipment to accommodate this emergency service have placed this particular installation almost in a class by itself as far as steam-electric generating plants go. Another noteworthy feature of this plant is the fact that its full capacity feeds directly into the distributing system at generator voltage, 11.5 kv.

The San Francisco steam plant supplements the other sources of power connected to the company's system, which consist principally of three large hydro-electric generating stations on the Feather River. These plants are connected into the company's San Francisco and peninsula distributing system through submarine cables which cross under San Francisco Bay. These cables are limited in capacity, expensive to install and maintain, and they constitute an appreciable hazard to service continuity. To eliminate this condition, and especially to guarantee good service, the steam plant has been built within the city limits of San Francisco. The unit now in operation is the first of an intended ultimate of four such units and was first synchronized into the system on Dec. 3, 1929. The insistent demand for power made it necessary to place the plant in service before it was fully completed, with attendant difficulties both to operation and construction. The combined construction and preliminary operation period ended about Feb. 15, 1930, with the completion of the painting and the final removal of the last of the construction equipment.

A site on the San Francisco water front where salt water for condensing purposes would be available was difficult to find, but finally a promontory of serpentine rock was purchased in that part of the city known as "Butchertown." Purging the site of hogs, rats and shrimp-drying platforms was no small part of the construction program. Now, the plant stands out both figuratively and physically as a white spot in the locality. The location has many particularly desirable attributes which include proximity to load, delivery of fuel oil by barge or natural gas by main pipe lines, availability of city mains for feed water, ocean water for condensing, and good rock for foundation.

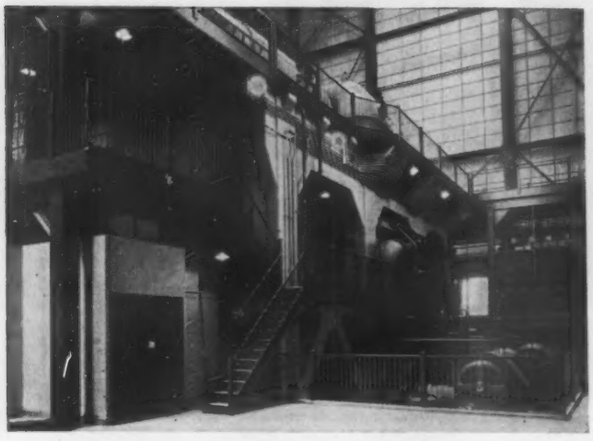
It was decided to grade the rock ridge to two elevations because of existing street levels, the upper elevation to support the outdoor switching structure, water tower and main oil storage tanks, and the lower level to accommodate the plant proper. The lower level was graded to the elevation that has been established for future shipping piers. Some 85,000 cubic yards of material was excavated from the site, most of which was used to build the dikes extending into the bay bordering the condenser circulating water channel.

---

[1] Construction Engineer, Great Western Power Company of California, San Francisco.

[2] Assistant Engineer, Great Western Power Company of Califronia, San Francisco.

Foundation construction was relatively simple. No piling was necessary because the underlying serpentine rock is of sufficient bearing quality to carry the loads imposed by the plant and its equipment. This rock is



Main unit as seen from ground floor

soft and disintegrates materially upon exposure to air, but remains firm and compact under the foundation. A loading of three tons per square foot was used in figuring the plant foundations.

Special Automatic Control

Since the plant is designed for emergency standby service to protect the city load it differs somewhat from the usual base-load plants. The main generating unit is to be kept rolling at full speed at all times and the turbine kept at a temperature that will permit instantaneous pick-up of full load. According to system power demand, the unit may at times carry some base load, but it is expected that most of the time it will be operating as a synchronous condenser subject to load application. The throttle valve on this unit is wide open at all times and the full control of load pick-up is placed on the governor. This provides for practically instantaneous response to load demands. This quick pick-up may cause the steam pressure to drop from 430 lb. to as low as 235 lb., but the turbine is designed to carry full rated load at 235-lb. throttle pressure.

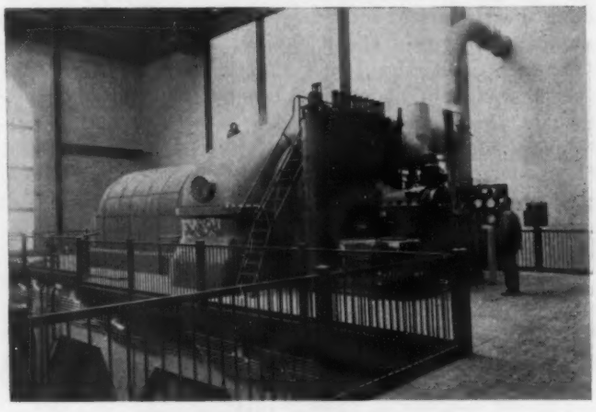
With the generator operating as a condenser the governor synchronizing nut is set in a position which will allow the unit to carry 35,000 kw. at 0.8 power factor and 60 cycles, as a generator. The governor is blocked against picking up load by an adjustable tie rod which holds the governor beam down to the no-load normal-frequency position. This tie rod is equipped with an adjustable ball-and-socket connection which breaks apart at a predetermined reduction in frequency (in this case approximately 0.6 to 1 cycle) and allows the governor to assume control of the turbine. The admission valve will open to a setting which will pass the required amount of steam for the turbine to carry a 35,000-kw. load within 2 sec. after the governor takes control.

When the unit is standing by and the turbine is being supplied with cooling steam only (15,000 lb. per hour) the steam pressure at the throttle is kept at 430 lb. gage. When full load is suddenly applied to the unit there will be a reduction in steam pressure and it has been estimated that the steam pressure at the throttle may drop to as low as 235 lb. gage while the boilers are being fired up and before they are able to supply the full demand for steam without further pressure drop.

The first stage wheel of the turbine will not pass sufficient steam at 235 lb. gage to operate the unit at 35,000 kw. To meet this condition the turbine is equipped with a secondary valve which will open after all primary valves have opened and which will admit sufficient additional steam to the second stage of the turbine to allow it to generate 35,000 kw. at 235 lb.

Normally the house turbine generator unit also is kept rotating at synchronous speed, operating solely as a synchronous condenser and with the main throttle valve on the turbine closed. The same small drop in system frequency which causes the main unit to pick up its load causes the house unit automatically to cut loose from the system and carry the auxiliaries at normal speed independent of system conditions. This is accomplished through two closely related automatic operations. Operation of the valve gear resulting from the frequency variation releases a latch attached to that gear which in turn causes a mechanism to open the throttle valve wide within a period of 1.5 sec. Then, as the unit picks up its load, reverse-power relays act to open the 2.3-kv. oil circuit breaker on the 11.5/2.3-kv. station service transformer bank, separating the 2.3-kv. service bus from the system.

Under standby operating conditions the oil feed to the header supplying the main burners is closed by a solenoid-operated valve (leaving the furnaces operating on pilot burners), the forced draft fans are shut down, the induced draft fans are operating at reduced speed and the circulating pumps also are operating at reduced speed. When the plant responds to an emergency demand, either a drop in steam pressure or the operation of a switch actuated by the house turbine throttle valve mechanism sets in operation a motor-driven drum-controller. This drum-controller opens the main fuel valve just mentioned and brings the required auxiliaries



43,750-kva. main generating unit

into operation at full speed in the proper sequence, all in about 30 sec.

Generating Equipment

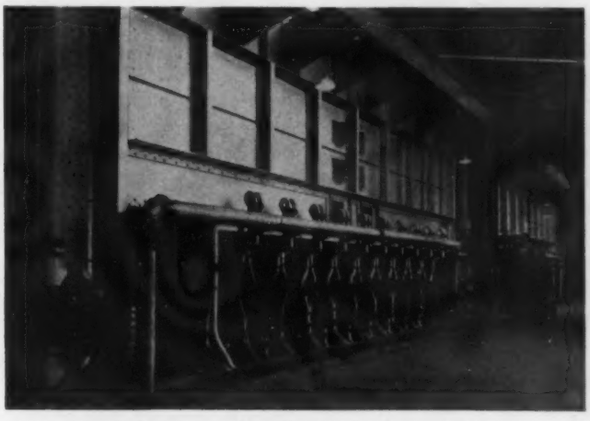
The main turbine-generator has a normal rating of 35,000 kw. or 43,750 kva., operating at 1,800 r.p.m., and

generates at 11.5 kv., 60 cycles. With steam at 350 lb. gage pressure at the throttle valve the unit is physically capable of carrying 43,750 kw. With steam at the minimum operating pressure of 235 lb., the normal full-load rating of 35,000 kw. at 0.8 power factor may be carried. The turbine itself has nine stages with provision for bleeding or extraction at the first, third, fifth and seventh stages. At the present time only two-stage extraction is used because of the intention to use the installation primarily as standby. In the future, if the unit is to be operated on a base-load basis, four-stage extraction will be utilized to improve operating efficiency. The corrective effect of this unit when operating as a synchronous condenser is sufficient greatly to improve the efficiency of the present transbay cables by raising the power factor of the San Francisco system.

The house turbine-generator is rated at 2,500 kw., 2.3 kv., 60 cycles, 3,600 r.p.m. It operates non-condensing when it is in service, but is provided with a bypass connection to the condenser on the main unit. Thus the turbine housing is evacuated, reducing the power input to the house generator from 175 kw. (1 lb. gage) to 125 kw. (1.5 in. absolute) when it is operating as a synchronous condenser with the steam supply shut off.

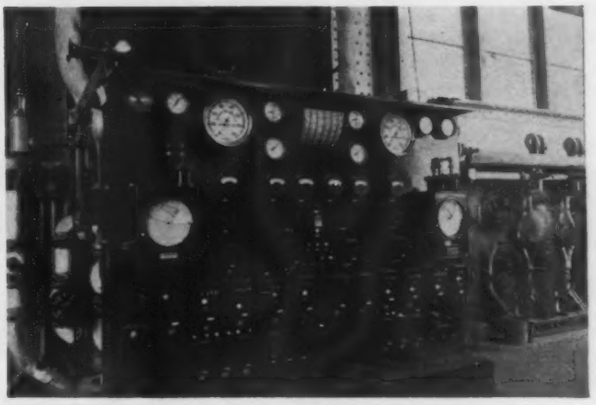
CO_2 fire protection is provided for both the main and the house generators, each being independent of the other in operation. Each generator has its own independent, totally enclosed recirculating air-cooling system. Bearing oil for both of the units is circulated through a vertical cooler in the turbine room while the main oil storage tanks, purifier and pumps are in the boiler room.

The raised platforms which carry both the house turbine and the main turbine generator unit are built up of structural steel encased in reinforced concrete and rest upon a reinforced concrete mat, 6 ft. thick. This structure is divided through to the foundation block, providing the effect of separate platforms for the house turbine and the main unit, thus minimizing the effect of any possible vibration.



Boiler room. Control panel at right

Directly under the main turbine is the horizontal single-pass condenser, which contains 5,489 ⅞-in. Admiralty mixture tubes, each 22 ft. long, providing a cooling surface of 27,400 sq.ft. This condenser is bolted directly to the turbine discharge casing and is supported on heavy springs to allow for expansion. The tubes are fixed at both ends, the water box at the discharge end being of the floating type with a rubber expansion joint between condenser shell and tube sheet.



Boiler-room control panel

Two two-speed motor-driven pumps, each capable of delivering 35,000 gal. per min., supply the condenser and the generator air coolers at an average head of 18.5 ft.

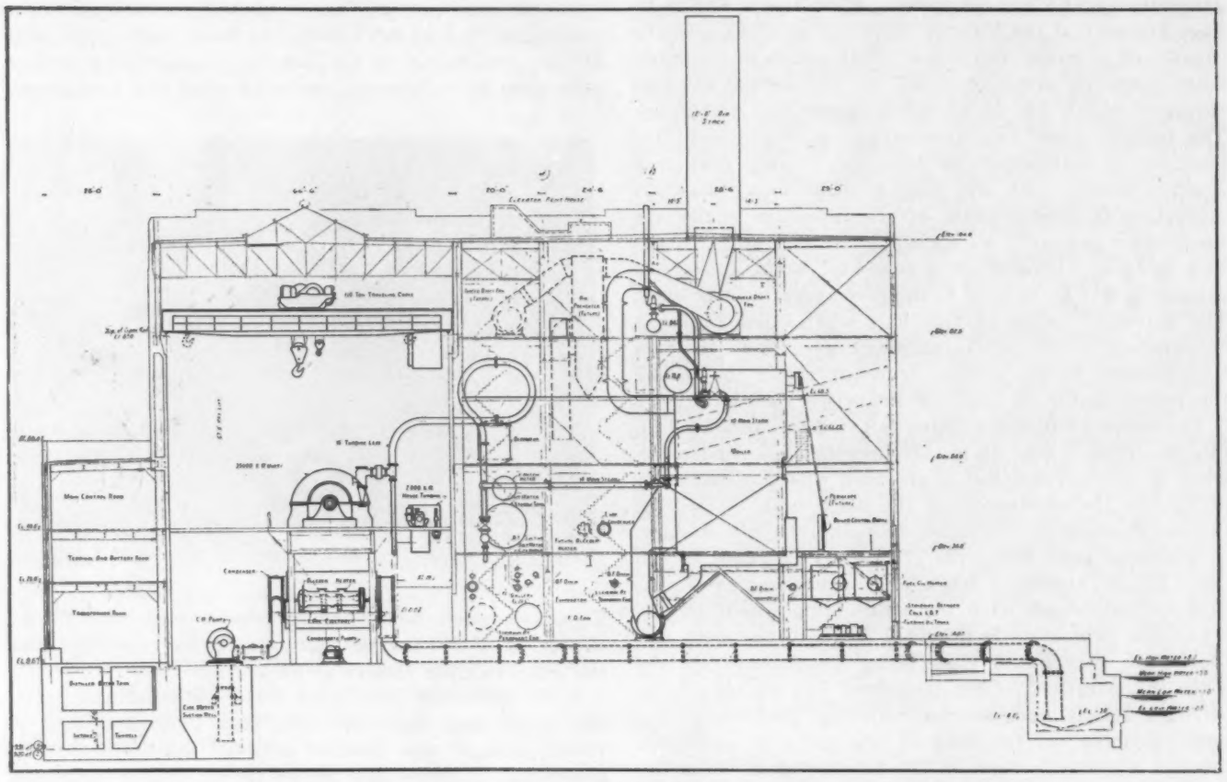
Since condenser circulating water is withdrawn from and discharged back into the San Francisco Bay, a 750-ft. channel was dredged between the dikes already mentioned to bring salt water to the intake structure adjacent to the main building. This intake structure is of reinforced concrete and contains the necessary rack bars, gates and removable screens to provide control of water and debris. From the intake structure the water flows through two concrete tunnels under the building to the suction ends of the circulating pumps. From the condenser, water is discharged through two 42-in. cast-iron pipes running underneath the boiler room and emptying into the bay outside the intake channel dikes.

Boilers and Related Equipment

Two 2,225-hp. boilers each capable of evaporating 290,000 lb. of water per hour are included in the initial installation. There are 56 tube sections, with thirteen 4-in. tubes to the secton, in each boiler. Provision is made for the future addition of water walls in the furnaces which at present are equipped with air-cooled walls. Water-cooled walls were not initially installed because of the uncertainty of their actual circulation characteristics under the extremely rapid load changes for which the plant is designed. Further, air-cooled walls were less expensive to install.

The main boiler drums are 40 ft. in length and 6 ft. in diameter, appreciably oversize as compared with ordinary design. Thus a maximum steam-releasing surface is obtained and possibility of priming under sudden heavy demands is reduced. These drums are built of 2⅛-in. plate and weigh 75 tons each. Two 5-in. U-bolts support each drum and its load.

Another special feature of the plant is the 3 x 36-ft. auxiliary steam drum which is placed directly above the main drum on each boiler. These auxiliary drums are provided with special baffles and the two saturated-steam outlets which lead from them to the superheaters are equipped with purifiers to insure separation of



Transverse section showing arrangement of present and future equipment

water from the steam under sudden and heavy steam demands. Special, high-capacity traps on the drums and purifiers carry away this water.

Normal steam pressure is maintained at 430 lb. gage at the boiler with a total temperature of 625 deg. F., which is obtained through the use of double-loop overdeck superheaters. Each of these superheaters has 9,280 sq.ft. of heating surface.

An oversize combustion chamber 21 x 33 ft. in plan and 25 ft. high is provided in each furnace to meet the firing requirements of rapid load changes. In the present installation there are 29 burners, nine of which are used as pilot burners and are designed to carry the load under idling conditions. The fuel range of the pilot burners is from 50 to 300 lb. per hour each, while the range of the main burners is from 225 to 1,500 lb. per hour each. Thus the total maximum short-time emergency fuel-burning capacity is 32,700 lb. per hour with a heat liberation of 34,000 B.t.u. per cu.ft. of combustion chamber. Under steady full-load conditions about 16,000 lb. of fuel per hour will be required, with a heat liberation of slightly under 17,000 B.t.u. per cu.ft. of combustion chamber.

Furnace bottoms are 20 ft. above the ground floor to permit the addition of ash pits in case coal burning should become necessary or economically advisable in the future. Provision also has been made in the design and arrangement of the building to permit the installation of air preheaters when they may become desirable.

There are two Sirocco-type single-width, single-inlet forced-draft fans for each boiler. These are mounted on the ground floor beneath the boilers in such a way that they are driven in pairs by a single 250-hp. motor mounted between them. Each intake is arranged to take half the air required for combustion through the air-cooled walls of the related furnace and half directly from the blower room. All of this air is discharged through the box girders which form the furnace bottom to the corresponding wind box at a temperature of 160 deg. F. under rated plant load. One dual-drive, double-width, double-inlet, multivane induced-draft fan is mounted above each boiler and serves that particular boiler, discharging into an individual 12-ft. stack 50 ft. high. For plant operation under idling conditions, each of the induced-draft fans is arranged to be driven by a special 10-hp. motor through a Texrope drive at one end of the shaft. For greater loads a 275-hp. direct-connected motor on the other end of the shaft is started automatically, as previously mentioned.

Duplicate exciters, one a dual-drive unit for normal operation, and the other a motor-driven unit for emergency operation, serve the main generator. Each of these exciters is rated at 800 amp., 250 volts, 1,160 r.p.m. Excitation for the house generator is provided by a direct-connected exciter, although emergency excitation may be obtained from the main exciters.

Heat Balance Cycle

Water from the hotwell is handled by either one of two motor-driven condensate pumps through two air-jet condensers. The intercondenser is cooled half by condensate and half by salt water, while the after-condenser is cooled entirely with condensate. This arrangement accommodates the wide variation in available condensate caused by the range of possible plant operation. From the air-jet condensers the condensate passes through the seventh-stage heater to the deaerator heater in the boiler room. The deaerator

receives its steam supply from three possible sources according to plant loads: from the fifth stage of the turbine under full-load conditions, from the third stage under light-load conditions, and direct from the steam line under idling conditions. From the deaerator heater the condensate discharges by gravity through a V-notch meter into the 15,000-gal. hot water storage tank. This storage of hot water is provided to accommodate rapid load changes. Stored water temperatures range from 212 to 224 deg. F. throughout the range of plant operation.

There are two six-stage boiler feed pumps, one motor driven and one turbine driven, on the ground floor underneath the hot water tank. Each of these pumps has a capacity of 1,000 gal. per min. at a pressure of 500 lb. Feed water is pumped through the evaporator condensers into the boilers at 261 deg. F. when the plant is operating with 35,000-kw. load and 28.5-in. vacuum.

City water is evaporated to supply make-up and the distilled water is stored in a 100,000-gal. underground concrete tank. For convenience in construction and simplicity in operation this tank was placed under the control room annex of the building and on top of the salt-water tunnels. All feed water is treated to prevent caustic embrittlement.

Fuel oil storage in the extent of 37,500 bbl. is provided by a tank on the upper level of the plant property where provision has been made for the installation of a second tank. An 8-in. welded pipe line laid on the south dike of the cooling water channel and extended on pile bents to a barge mooring provides for convenient delivery of fuel oil. Fuel oil is pumped from barge direct to storage tank by the unloading pumps on the delivery barge.

From the main storage tank oil flows by gravity to two underground concrete service tanks near the building. These tanks have a combined capacity of 960 bbl. Three pumps, two motor-driven and one turbine-driven, deliver fuel oil to the burners at 210-lb. pressure. The turbine driven pump is an emergency unit.

Oil is heated to 250 deg. F. between pumps and burners. The service tanks are equipped with liquidometers for fuel measurement.

All high-pressure piping in the plant is 600 lb. standard seamless tubing with straight Van-Stone joints with serrated facing. The main steam line to the turbine is 16-in. tubing and all steam manifolds are seamless

Data Concerning Some of the Major Equipment

Equipment	Size or Rating	No. Units	Manufacturer	Remarks
Main generator	43,750 kva., 11.5 kv., 60 cy. 1,800 r.p.m.	One	General Electric	35,000 kva. capacity as synchronous condenser at zero power factor, over-excited.
House generator	2,500 kva., 2.3 kv., 60 cy. 3,600 r.p.m.	One	General Electric	2,000 kva. capacity as synchronous condenser at zero power factor, over-excited.
Main turbine	43,750 kw.	One	General Electric	43,750 kw. max. capacity at 350 lb., 625 deg. F., and 35,000 kw. max. at 235-lb. dry, saturated steam.
House turbine	2,500 kw.	One	General Electric	3,000 kw. max. emergency capacity with 235-lb. dry, saturated steam and 3-lb. gage back pressure. Normal operation 2,500 kw. at 350-lb., 625-deg. F. steam and 1-lb. gage back pressure.
Exciters	200-kw., 250-volt, 1,160 r.p.m.	Two	Allis-Chalmers	Driven by 300-h.p., 2.3-kv. Allis Chalmers motors, one dual with 300-h.p. Terry turbine.
Boilers	2,250 h.p., 290,000 lb. per hour	Two	Hedges-Walsh-Weidner	Cross-drum, straight-tube.
Purifiers		Two per boiler	Hagan	Two on aux. drum each boiler.
Superheaters	9,280 sq. ft.	Two	Foster-Wheeler	Overdeck, double-loop convection.
Air-cooled walls	2,000 sq. ft.	Two	Deitrich	Sectionally supported with 9-in. tile and 9-in. air space backed up by 1.5-in. insulated steel casing.
Stacks	12 ft. 2 in. diam., 50 ft. high	Two	Western Pipe & Steel	Welded steel lined with 2.5-in. Gunite, supported on Building frame.
Fuel oil storage tank	37,500 bbl.	One	Western Pipe & Steel	One now, one future.
Fuel oil pumps	25 gal. per min.	One	Quimby	Driven by a 15-h.p. Terry turbine.
	140 gal. per min.	Two	Quimby	Driven by 50-h.p., 2.3-kv. Westinghouse constant speed induction motors.
Fuel oil heaters	68,000 lb. per hour	Two	Griscom-Russell	Tagliabue temp. controllers and valves.
Burners	225 to 1,500 lb. per hour	Twenty per boiler	Peabody	Main burners.
	50 to 300 lb. per hour	Nine per boiler	Peabody	Pilot burners.
Forced-draft fans	65,000 c. ft. per min. at 160 deg. F., 6-in. static pressure	Two per boiler	American Blower	Single-inlet, radial-flow; forward curved blades. Driven in pairs by 250-h.p. Westinghouse 2.3-kv. constant-speed motors.
Induced-draft fans	60,000 cu. ft. per min. at 500 deg. F., 135 r.p.m., 0.35-in. static pressure	One per boiler	Sturtevant	When driven by special 10-h.p. Westinghouse motor through Texrope drive-light loads.
	250,000 cu. ft. per min. at 725 deg. F., 490 r.p.m., 3.6-in. static pressure			When driven by 275-h.p., 2.3-kv. Westinghouse motor.
Boiler feed pumps	Six-stage, 1,000 gal. per min. at 525 lb.	Two	Cameron	One driven by 2.3-kv. constant speed Westinghouse motor; one driven by Terry turbine, atmospheric exhaust (spare unit).
Condenser	27,400 sq. ft.	One	Ingersoll-Rand	Single-pass, divided water box, rigid connection, spring supported.
Circulating pumps	28,700 gal. per min., 2 pumps on entire condenser. 35,000 gal. per min., one pump on entire condenser	Two	Ingersoll-Rand	Two-speed, 192 and 315 r.p.m., driven by two-speed 175/50-h.p. 2.3-kv. Westinghouse motors.
Condensate pumps	1,150 gal. per min., 575,000 lb. per hour	Two	Ingersoll-Rand	Driven by 75-h.p., 2.3-kv. constant-speed Westinghouse motors. (One unit spare.)
Air removal equipment	72 lb. per hour	Two	Ingersoll-Rand	Steam jet with surface-type inter- and after-condenser.
Generator air coolers	90,000 cu. ft. per min.	One	General Electric	Main generator.
	9,000 cu. ft. per min.	One	General Electric	House generator.
Deaerator	500,000 lb. per hour, normal, 600,000 max.	One	Elliott	Reboiling type with heating and air separating trays.
Extraction heater	365,000 lb. water per hour, 94-164 deg. F.	One	Elliott	Seventh stage. 1,200 sq. ft., 27,300 lb steam per hour. Admiralty tubes.
Evaporator	13,500 lb. per hour	One	Griscom-Russell	Single-effect, high heat level.
Evaporator feed water heater	25,000 lb. per hour	One	Elliott	Open type.
Turbine room crane	100-ton main hoist, 10-ton aux.	One	Shaw (M. M. & M.)	4-motor. 63.5-ft. span.
Service elevator	3,500 lb.	One	Pacific	Push-button control.
Combustion control		Two	Carrick	
Fire extinguisher equipment		Two	C-O-Two Fire Eqpt. Co.	

forgings. For economic reasons all pipe of more than 4-in. diameter was purchased fabricated.

Electrical Layout

The 11.5-kv. bus is outdoors on the bench above and behind the plant. It consists of a galvanized steel structure, 40 ft. wide, 180 ft. long and 36 ft. high, supporting two three-phase buses made up of 2-in. copper tubing carried on 37-kv. post type bus supports. Because of fog and dirt conditions the entire outdoor equipment is insulated for 37 kv.

The main generating unit is connected directly to this bus through four 1,250,000-circ.-mil bronze-armored cables per phase running from the reactor compartments under the generator through the cable tunnel which extends from the power house to the switch yard. A main and an auxiliary bus are provided. One oil circuit breaker per circuit is installed together with a bus tie breaker which may be used also as a feeder breaker during inspection or repair periods. Each circuit breaker may be sectionalized from the main bus by means of gang-operated disconnecting switches. Double-bus circuit breakers are provided only for the generator leads.

At present there are six outgoing 11.5-kv. circuits, three provided with 660-amp. oil circuit breakers and three with 600-amp. breakers. The two oil circuit breakers on the main generator leads are rated at 2,200 amp. and the bus tie circuit breaker has a similar rating. Each of the feeder circuits is carried over the top of the bus structure and arranged for connection to the auxiliary bus through gang-operated disconnecting switches. This outdoor switching equipment was supplied by the Pacific Electric Manufacturing Company.

Current and potential transformers for protection and metering of feeder circuits and for generator differential protection are mounted in the outdoor structure.

Fed directly from the 11-kv. bus through a 600-amp. oil circuit breaker is a 2,500-kva., 11.5/2.3-kv. transformer bank which normally serves the 2.3-kv. station service bus. In the normal operation of the plant or under idling conditions, power for the 2.3-kv. bus thus comes from the system. However, when the house generator picks up load it will tend to feed back into the 11.5-kv. bus through the station service transformer bank. This reversal of power operating through a directional relay will trip the oil circuit breaker connecting the transformer to the 2.3-kv. bus, leaving the house unit carrying all of the station auxiliaries.

There are two duplicate 2.3-kv. service buses tied together at one end by disconnecting switches and at the other end by an oil circuit breaker. Each of these buses carries all of the auxiliaries for one boiler. Thirteen truck-type oil circuit breakers serve the various circuits feeding the station auxiliaries. The air compressor, boiler feed pump, motor-driven exciter sets, house generator and house transformer bank are connected to this bus by individual circuit breakers. The remainder of the auxiliary equipment served directly by the 2.3-kv. bus is arranged in four groups: two groups each containing one circulating pump and one condensate pump, and two groups each containing one induced-draft fan, one forced-draft fan, and one fuel oil pump. The truck-type breakers are provided with induction overload relay protection, while the remaining breakers are protected by thermal relays.

All the other station auxiliaries are driven by 440-volt motors served through a 300-kva., 2,300/440-volt transformer bank. Two dead-front switchboards, one in the electrical service bay and one in the boiler house, provide convenient and safe control for the 440-volt equipment. The foundation and superstructure of the main building contain 2,300 tons of structural steel and 11,500 cubic yards of reinforced concrete. The steel was made exceptionally heavy because of the earthquake resistant design which provides against an earthquake shock equivalent to 10 per cent of the combined dead and live load at the center of gravity of the plant. Wind load designed for at 30 lb. per square foot, oversize boiler drums, elevated furnaces, and provision for future coal bunkers on the roof also contributed their quota to the justification of the heavy building design.

The present turbine room is 72 ft. 6 in. wide and 112 ft. 8 in. long, the present boiler room 96 ft. 8 in. wide and 126 ft. 6 in. long. Both the turbine and boiler rooms are designed for future extensions to the south, pressed metal sections being used for temporary walls on the south end of the present structure. All exposed concrete surfaces were smoothed with power grinders and subsequently painted with an oil paint on the interior and a cement wash on the exterior. This treatment has given the building both inside and out a durable and attractive finish.

Concrete used in the structure was designed for 2,000-lb. loading and where in contact with salt water for 3,000 lb. The 3,000-lb. design is for density to prevent percolation of salt water to the reinforcing. As a further precaution against salt water percolation the reinforcing was placed at a minimum of 6 in. from the surface in all cases. Very close technical control of concrete mix was accomplished through the use of a weighing batcher. Further to obtain dense concrete and smooth surfaces 12 lb. of Celite per barrel of cement was specified in the mix and the forms were vibrated with air hammers as the concrete was placed in them. Form clamps were used instead of the usual tie wires further to guard against salt-water action.

A combination freight and passenger elevator has been provided in the boiler room to serve all of the levels. Supplementing this a 5-ton hoist serves all levels through the hatchways. In the turbine room a 100-ton crane provides ample handling capacity and was installed so as to be available for use during construction. The heaviest piece of equipment handled during the erection was the 80-ton stator of the main turbine generator unit.

Floors on the turbine platform and on the ground level floor beneath the platform are of red tile. Throughout the remainder of the building Kalman finish is used on all floors. For floors and stairways in the boiler house Mitco galvanized gratings are used. Galvanized gratings were chosen because of their bright appearance, ease of cleaning and elimination of periodic painting.

The plant was designed by McClelland and Junkersfeld, consulting engineers, in conjunction with the engineering department of the Great Western Power Company of California under the direction of W. G. B. Euler, general superintendent and J. A. Koontz, Jr., electrical engineer. Construction was carried on by the construction department of the Great Western Power Company acting as general contractor. C. P. Rhine served in the capacity of resident engineer, R. T. Branch represented the consulting engineers, and W. H. Gilstrap served as general foreman.

Palm Springs—once the home of "desert rats" and a lonely health resort—now most famous of America's fashionable desert resorts during winter months. A panorama from above the Tom O'Donnell home

THE DUDE DESERT

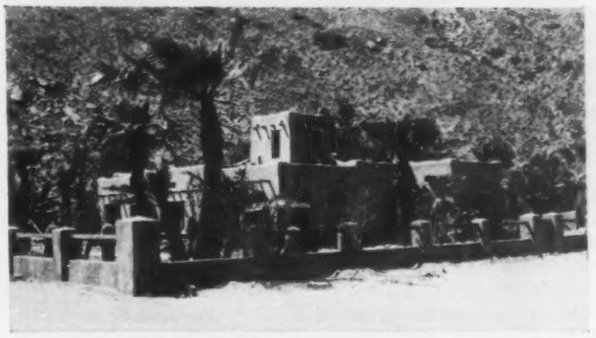
By JAMES G. NUSBAUM

Superintendent Coachella Division, The Southern Sierras Power Company

Wealth Has Discovered the Sunshine and Health of the Winter Desert and Provided Itself With All the Comforts That Electricity Can Bring

PALM SPRINGS, nestled close to the base of Mount San Jacinto, Riverside County, Calif., is one of the most completely electrified towns to be found anywhere. It is a resort made up of winter homes and hotels. Located on the desert side of the mountain, at an elevation of 500 ft. above sea level, near the head of the Coachella Valley and about 50 miles from Riverside, the snow capped Mount San Jacinto towers 10,805 ft. above it and gives it a setting combining the extremes of desert coloring and mountain snow.

Until recently Palm Springs enjoyed as its chief distinction only the wealth of desert flowers around it during the early spring after a year of rain in the desert. It was a stage stopping point and later the first hotel gained some note as a place to which invalids needing sunshine and dry air could come and recuperate. Then it was discovered—by some enterprising realtors—and now assumes first importance as a fashionable wintering place for people of wealth, particularly those living on the Pacific Coast.



The home of W. E. Reis. Electricity is the logical fuel for these spotless oases

Many who have come for sunbaths have been impressed with the fertility of the Coachella Valley and its adaptation to the raising of high grades of dates. As a consequence

Minarets and burnished copper domes, the embellishments of Persia and the Moors, are used extensively with adobe architecture

An adobe hut houses a power company residential substation and a pumping plant for several homes at La Quinta

not only have a number of people of means built themselves comfortable and commodious winter homes in the region but not a few have developed large acreages to grapefruit and to dates with financial returns justifying their elaborate investments.

In the "village," as it is termed affectionately, of Palm Springs there are in all eight hotels. Among these there are the Desert Inn, El Mirador and the Oasis of national fame. Del Tahquitz, recently completed by Fritzi Ridgeway of Hollywood, is equipped with a complete electric kitchen and bake shop. It has a connected load of around 80 kw. Each of the previously mentioned hotels likewise has a heavy connected load, although they are not as yet completely electrified.

One hotel, the "Deep Well Guest Ranch," I believe deserves special mention. It has been developed by Francis M. ("Borax") Smith, of Oakland and San Francisco, to represent a high class "ranch." The buildings are arranged in units with ample space and sunshine. The property is completely electrified and has a total connected load close to 500 kw. in lighting, heating and small motors. It is served by an underground conductor at 4,000 volts with a transformer bank located in a building of its own near the center of the load.

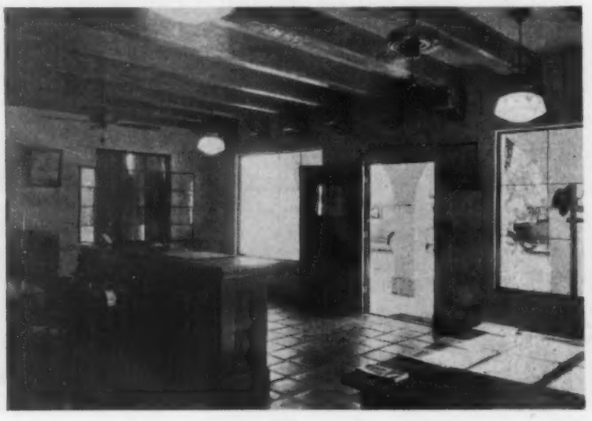
Ten water heaters are installed in the various units with comparatively short, well insulated service pipes, some direct to faucets and others with return circulation. The guest rooms, lobby, office and dining room are all equipped with built-in types of air heaters. Dining room, office and lobby are equipped with thermostatic control of heating. Particular attention was paid to the heating in the design of the buildings.

The residences in Palm Springs are all of high class design and construction and in most cases completely electrified. Many of the homes are owned by people of prominence, such as Mrs. Berge, of the Pierce Arrow Company; Philip Boyd, of Indianapolis, closely associated with the Marmon company; William Reis, of U. S. Steel; de Brabront, a French artist; King C. Gillette, of safety razor fame, and many others.

Actinic sunshine for sunbaths on warm winter days, electric heat for cold desert nights. ABOVE, *the home of Charles E. Adams.* BELOW, *the home of Mrs. Blanche Brill*

Hotel La Quinta, another winter resort hotel of the bungalow type, is situated in an exclusive cove, in the foothills on the west side of the valley and a few miles south of Palm Springs, off the highway about a mile. The electric equip-

BELOW, *the Palm Springs office of The Southern Sierras Power Company, with L. E. Kramer, local agent, in his pith helmet. Upstairs is a home for the staff, and at right the attractive main floor office*



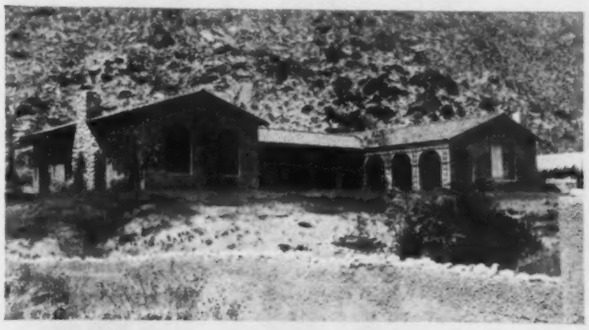
Bright awnings, blue and gold tile on dazzling white stucco, stop the daytime tourist to sell him fresh dates. Floodlighting of the date orchard at night makes a strangely wonderful sight. The date gardens of King C. Gillette at right

ment consists of a completely equipped kitchen, refrigerator, and air heaters with a total capacity of around 120 kw.

A special substation was built to serve this community. Distribution transformers in the hotel building are served at 4,000 volts direct from the Palm Springs substation of The Southern Sierras Power Company by means of underground circuits. In connection with the hotel there are a number of pretentious winter residences each completely electrified and served underground, with connected loads ranging from 20 to 60 kw.

In the lower Coachella Valley adjacent to La Quinta hotel begins the high class agricultural development, the principal crops being grapefruit and dates.

The date industry was started in this valley by importing offshoots from the Euphrates River Valley, from Egypt and from Algeria, and bids fair to become one of the most spectacular industries of the Southwest. Seven hundred acres are now planted to date palms and the annual yield is approximately 2,000,000 lb. The principal variety is the Deglet Noor (Date of the Light). A fully developed date garden



At the foot of sun scorched mountains many homes are nestled. The all-electric home of L. E. Lonsberry

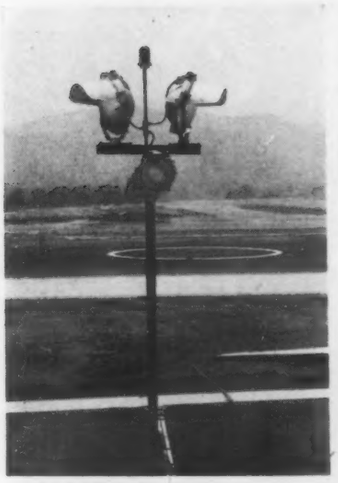
will produce as much as 10,000 lb. to the acre, netting the grower very ample returns.

Charles R. Crane, retired president of the Crane Company and former minister to China, and King C. Gillette have extensive date gardens in this area, completely electrified. Stephen M. Griffith, of the Griffith Paving Company, is developing a garden and has constructed a complete electric home equipped with a 60-kw. load. Servants' quarters and all outbuildings are equipped with hot water service and built-in type air heaters.

The grapefruit from this district is of the very highest quality. The acreage planted to this fruit is not yet extensive but is increasing rapidly. Mr. Gillette is planting 480 acres. The water for this development is pumped from five wells by means of electrically driven pumps aggregating 230 hp. There are seven cottages in all on the property for the help, each of which is equipped electrically throughout.

With an attractive shop in Palm Springs, the electrical contractor, Knupp and Fairnie, two former employees of the Southern Sierras company, have established a high standard of installation work in this district and have sold much domestic equipment.

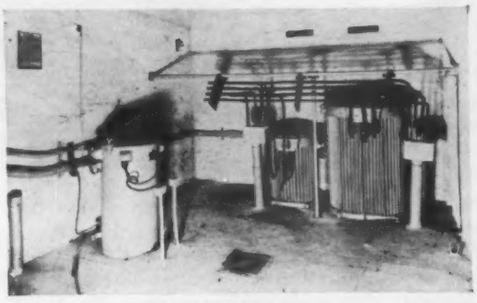
BELOW, *Cyrus K. Pierce uses the sun for hot water heating, with an electric heater for standby, at his La Quinta home*



Light for Night

DEVELOPMENT of night flying in the Western states, for the carrying of both passengers and mail, has resulted in the lighting of many of the principal airports, as well as many miles of airways. For instance, in the Los Angeles metropolitan area ten of the 52 landing fields are lighted; three carry the Department of Commerce's classification "A" for lighting equipment. Around San Francisco three airports fall in Class "A" as do the Denver and Fresno ports. Lighting in conjunction with aviation has presented many problems which the illumination engineer has successfully solved.

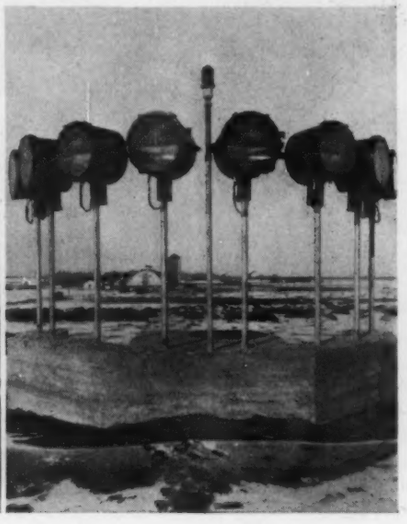
All buildings at airports are floodlighted. A special hangar roof floodlighting unit developed by Crouse-Hinds and installed at the Grand Central Air Terminal, Los Angeles, is shown above



Reliability is essential in airport lighting. Utmost care is used in installing equipment. The transformer vault serving the Los Angeles Airport is shown above

Among the field floodlights at Oakland Airport is the B.B.T. air mail type landing light equipped with a 150-amp. high intensity arc mechanism as shown below. This light throws a 180-deg. beam of 30,000,000-candlepower intensity

Denver spent $31,000 in lighting its new Municipal Airport, views of which are shown below. Changing winds necessitate two runways for landing. A B.B.T. field floodlighting unit (left) with a 180-deg. beam spread lights one runway. The second runway is illuminated with eight 3,000-watt Westinghouse field floodlighting projectors (right). A 24-in. Crouse-Hinds revolving beacon equipped with two 14-in. green course lights is installed on the roof of the administration building (center)

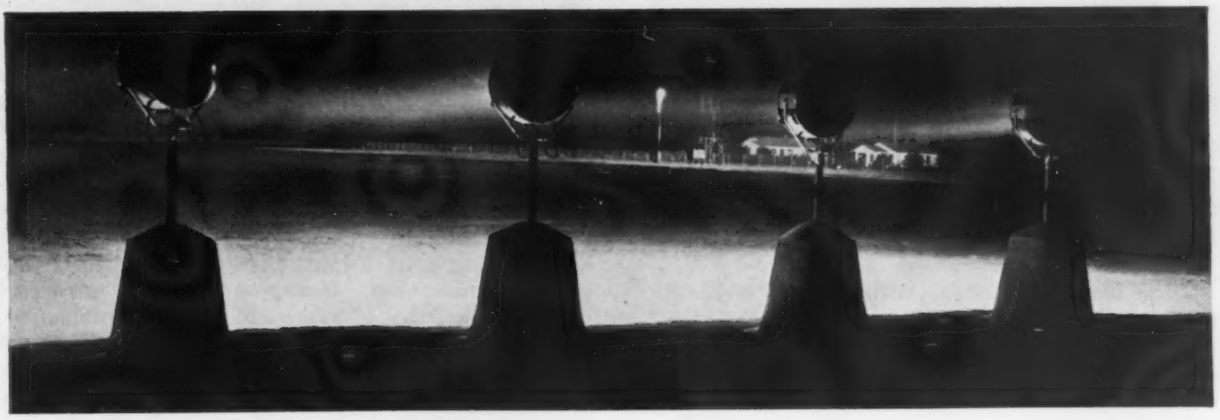


Flying — Some Recently Developed Western Airports

Supplementing the customary illuminated wind cone at the Oakland Airport is a wind tee in the shape of a monoplane with a 12-ft. wing spread which is lighted with orange Neon tubes. This is visible from an elevation of 10,000 ft.

Grand Central Air Terminal, Los Angeles, rivals the finest railway terminal in equipment and conveniences. The central tower (right) is topped with a revolving beacon. This tower contains an observation room in which are located remote controls for all of the field lighting and signal systems

Los Angeles Airport, a municipal undertaking, is a model field. The central hangar (left) shows the type of building floodlighting equipment used. Fresno spent $21,000 on the initial lighting equipment for its airport. Below is a night view of one of three banks of 3,000-watt Crouse-Hinds landing projectors that illuminate the two 3,000-ft. runways. With three banks of landing lights it is possible for a plane to land at all times with the light source at the pilot's back



Automatic Hydro-electric Plant

Proves Its Economies

By C. W. Colvin

Engineering Department, British Columbia Electric Railway Company, Ltd., Vancouver, B. C.

MORE than a year of satisfactory operation of the 10,000-kva., fully automatic Alouette hydro-electric generating plant has convinced the British Columbia Electric Railway Company that the added expense incurred in providing the additional equipment required for fully automatic operation was more than justified. From both the point of view of electric service and plant maintenance the project is adjudged as fully satisfactory. With fifteen emergency and six automatic shutdowns during the first year of its operation, not one was due to failure or improper functioning of the automatic equipment.

As described in Electrical West (Aug. 1, 1928, pp. 73-75), the generating equipment installed in the Alouette plant consists of a single vertical shaft turbine direct-connected to a 10,000-kva. vertical generator. The turbine is rated at 12,500 hp. under the conditions of average head and water flow, respectively 125 ft. and 700 sec.-ft. Normal starting and stopping signals are given by closing or opening an oil circuit breaker at the Stave Falls hydro-electric plant 10.5 miles away. The circuit breaker in question is at the Stave Falls end of the Alouette-Stave Falls 66-kv. transmission circuit through which Alouette power is delivered to the Stave Falls bus. Upon closure of this circuit breaker at the Stave Falls plant the Alouette plant automatically starts up, synchronizes itself with the transmission system and builds up its load according to its governor setting. Upon opening of this same circuit breaker the Alouette plant automatically shuts itself down.

Further to refresh the memory of the reader concerning this plant, the following average operating data are quoted:

Complete opening of main valves	70	sec.
First movement of main unit	90	sec.
Synchronization	3.5	min.
Full load	10	min.
Shutdown ready for next start	2.2	min.

These times are taken from the moment of the starting or stopping signal.

The station was first started May 11, 1928, for purposes of adjustment of automatic equipment and for test. It is a fact of interest that during the period of adjustment and test, complete efficiency tests by the salt-velocity method were carried out successfully. Commercial service was not required at the station until Aug. 15, 1928, and on that date accordingly it was placed in active service. From carefully kept records covering the operation of Alouette plant, the following data are taken which represent a summarization of the plant's operating history from Aug. 15, 1928, to Aug. 14, 1929:

1. Total hours running—6,003.5.
2. Total kilowatt-hours produced—46,937,800.
3. Power factor range—98 per cent lagging to 96 per cent leading.
4. Plant factor—59.5 per cent.
5. Maximum peak load—10,300 kw.
6. Number of emergency shutdowns—fifteen.
7. Number of automatic shutdowns—six.

The term "emergency shutdown" refers to times when because of some trouble or impending trouble it was deemed advisable to shut down the plant for repairs or adjustment. At such times the shutdown was prearranged and the plant was taken out of service with the permission of the load dispatcher, the plant's normal load having been distributed among the other generating plants. Of the fifteen emergency shutdowns, thirteen were due to governor driving belt trouble. This trouble finally was overcome definitely and no outages due to this cause have occurred since Dec. 4, 1928. Broken links on turbine gates were the cause of the remaining two outages classified under this heading.

Of the six "automatic shutdowns" one resulted from lightning on the transmission line, three from short circuits on the transmission system, one from a lamination clamping finger becoming loose and puncturing the insulation, causing the differential relays to remove the machine from service, and one was caused by a bad synchronizing operation due to the governor belt trouble previously mentioned. It may be noted that in no case was any emergency or automatic shutdown attributable to improper functioning of any of the automatic equipment. On the contrary, the various devices have performed in all cases the functions expected of them,

probably with more certainty and expedition than would have been the case were the stations manually operated.

During the design studies preceding the construction of the station it was estimated that a well regulated water flow would permit a continuous load of 6,630 kw. on the plant. Also it was estimated that the prevailing power factor probably would be 90 per cent. Thus with a rated installed capacity of 9,000 kw. (10,000 kva. at 90 per cent power factor) the plant factor would be 73.7 per cent. Actually, however, the plant factor for the one-year period under review was, as previously mentioned, 59.5 per cent. This lower figure is due to abnormally low runoff from the watershed area which serves the plant through Alouette Lake.

Routine maintenance work is cared for by a resident maintenance man who lives about 250 yards from the station. A regular inspection is made every two weeks at which time relays, instruments and control equipment are cleaned and any necessary adjustments are made. While the maintenance man frequently is present at prearranged starting or stopping of the plant, he is there as an observer only, taking no part in the operation.

▼ ▼ ▼

Idaho Power Co. Develops Farm Water Heater

By L. W. BRAINARD
Sales Manager, Idaho Power Company, Boise

DURING the fall of 1928 there developed an abnormal sales resistance to electric range sales in the rural districts served by the Idaho Power Company. A check of the situation indicated this sales resistance to be almost entirely in rural homes where pressure water systems were not in use and the reservoir on the coal range was being depended upon to supply hot water. This condition prevented the sale of an electric range, or at least limited such sale to a small model to be used as an auxiliary to the coal stove.

The first solution of this problem was attempted in the Twin Falls division where J. D. Orr, division manager, and members of his organization attempted to find an electrical substitute for the old reservoir.

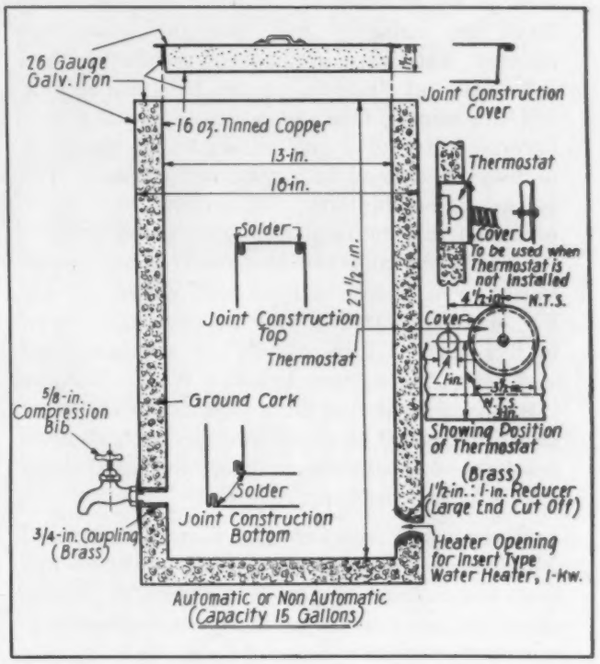
They conceived the idea of a 12- to 15-gal. galvanized iron container insulated with balsam wool and wood, heated by an immersion electric heater inserted in the side of the tank near the bottom, and equipped with a faucet in the opposite side of the tank slightly above the level of the heater. This location for the faucet was to protect the heating element by preventing the water being drained below the level of the heater. A few of these water heaters were built and sold during the fall of 1928.

These tanks appeared to answer the purpose very well and met with a ready acceptance. By spring, however, it was found that they were short lived owing to the galvanized water container rusting through and permitting moisture to find its way into the insulation, thereby reducing efficiency.

Undaunted by this rather to be expected failure which befalls many such products in their infancy, the originators still felt that the idea was practical and would prove a solution of an important sales problem. It was estimated that 250 such tanks, if properly constructed, could be sold during 1929. Thus a more exhaustive study was made by J. B. McLain, sales engineer of the commercial department of the company, with a view to perfecting the construction of this "farm water heater" as it is now called. After considerable experimentation with different materials and construction methods, an entirely changed product, giving practically 100 per cent service, was evolved.

The farm water heater, as now designed, is made of No. 16 tinned copper for the water tank with 26-gage galvanized iron for the outside walls and bottom. Ground cork is used for the insulation and brass bushings are inserted in the openings for the faucet and the heater. In an endeavor to make the farm heater as convenient and economical of operation as the water heating systems applied to pressure installations, a thermostat was added.

Up until the end of November, 1929, 480 heaters had been manufactured locally on these specifications. Practically all of these have been placed and it is believed that 500 were sold by the end of the year. Quite obviously also, a very considerable resistance to range sales in rural territory has been pierced.



Details of 15-gal. farm water heater of reservoir type developed for rural territories in Idaho

Because these tanks are filled manually, an accurate measure of the number of gallons of water heated is difficult to secure except by test. Such tests as have been made indicate that while the number of gallons of hot water used per person or per family is less in rural territories than in the city the cost per gallon of hot water compares very favorably with the cost per gallon in the city where pressure tanks are in use.

Electrical West

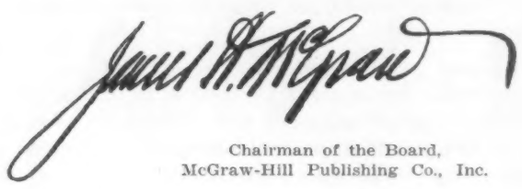
G. C. Tenney, *Editor*

An Appreciation of Charles T. Hutchinson

THE measure of any man's contribution to his work lies in the character he has developed rather than in his accomplishment. This has been singularly true in the life of Charles T. Hutchinson. For above all he has been a great personality and a friend to many men. And it was through this gift of friendship that the high resources of his character and his capacities came to exercise their natural qualities of leadership.

It is an unusual thing for a man to come from one industry and one profession into another and win immediate popularity and influence, yet "Hutch," as all men called him, left the mining field not so many years ago to become editor of a publication in the electrical industry and head of a publishing house. His sincerity, his honesty, his breadth and depth of vision, his courage and willingness to fight for the right and the progressive, his never-failing whimsical humor, and above all his human understanding and his responsive sympathy, carried him rapidly to acknowledged leadership throughout the Far West. He was the guide, critic and champion not of a single group but of all of them, and an inspiration to practical co-operation among electrical men that was far reaching.

His passing has brought a great sense of personal loss to every man with whom he has been associated. But it is the bond of friendship that will linger longest in our memories.



Chairman of the Board,
McGraw-Hill Publishing Co., Inc.

"Hutch"

AS EASILY describe the inflection of his voice or the twinkle of his eye—as easily define the subtleties of personality—as express adequate appreciation of a man like Charles T. Hutchinson.

His was a rare gift—a genius for human relationships. It was no effort for him to make acceptable, even desirable, those tasks which formerly had appeared difficult, almost impossible—to make reasonable and agreeable those propositions which seemed to provoke only controversy.

We, who were in daily association with him, marveled at the way his nimble wit could untangle the knots of human relations and misunderstandings. In him there seemed to be contained the universal solvent for the problems of his fellows. The road to his open office door was a well worn path over which every day men came with their diffculties or the difficulties of their group for advice and counsel. It was ever a source of wonder to us, his fellow workers, that the visitor always left smiling and mentally refreshed.

Perhaps it was because at all times he seemed to expect finer things from the individual than that person could conceive for himself. To be believed in by "Hutch" was sufficient inspiration to start one with new courage and with some of his unbounded enthusiasm and faith.

Here, naturally, was a man under whom others developed and grew. "Hutch" took great pride in nurturing others to achievement. He was possessed of that rare faculty of leadership which inflames the spirit of others to do worthy deeds. His sure critical judgment, coupled with his power to convince and inspire, has set many men on the road to finer and better things.

Volumes might be written of his high ideals of fellowship and co-operation, of his unfailing cheerfulness, his fine sense of sportsmanship, and his breadth of sympathy and kindly understanding. But all who knew him are aware of those qualities of his.

We, his associates, mourn his passing, for from our midst we have lost one whom we respected, revered and loved. But we treasure the years spent in working for and with him, counting our lives as so much better for this privilege.

Chas T Hutchinson

CHARLES TRIPLER HUTCHINSON was born in San Francisco January 31, 1876. His was a pioneer California family. And to this pioneer ancestry he owed two traits of character, courage and vision.

His formal schooling ended when he was graduated from Polytechnic High School. He entered the employ of the Union Iron Works as office boy in 1894. By steps he received his engineering training — timekeeper, shipping clerk, accountant, draftsman. At twenty-one he was assistant superintendent of the mining machinery works. At the time of his resignation in 1907 he was general manager of the mining machinery department. For the next five years he held a similar position with the Joshua Hendy Iron Works.

The mining machinery field bears the marks of his eighteen years' association. Automatic ore feeders, rock breakers and stamp mills carry improvements for which he was responsible.

Somewhere in his being he carried the journalistic spark, and it is in journalism and publishing that he displayed the characteristics by which his memory will live. In 1912 he founded *Western Engineering*, serving the construction and civil engineering fields of the West. Although nominally editor of this publication, he laid the groundwork for the publishing career that was to follow.

In 1915 Editor Hutchinson became Publisher Hutchinson as vice-president and general manager of the *Mining and Scientific Press* and *Western Engineering*. With the war *Western Engineering* became *Metal Trades*.

His association with McGraw-Hill dates from 1922 when *Mining and Scientific Press* was merged with *Engineering and Mining Journal*. Vice-president and general manager of the McGraw-Hill Company of California and editorial director of ELECTRICAL WEST, president of the California company and publishing director of the magazine are positions that he held.

In the meantime he had become a commanding figure in the electrical industry. His high ideals of fellowship and co-operation resulted in his appointment as chairman of the advisory committee of the California Electrical Bureau. In this capacity he served for four and a half years. Every branch of the industry benefited from his counsel and advice.

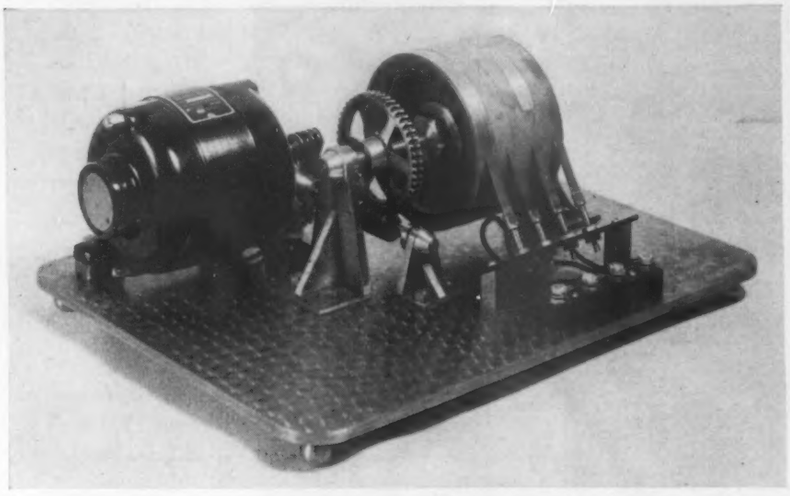
Three days after Christmas he took to his bed with a recurrence of a chronic ailment—sciatic inflammation. For seven weeks he was confined to his home. Suddenly, a serious throat infection developed. The end came quietly, peacefully, toward midnight February 12.

Engineering Practice

Improving System Speed-Time Accuracy

"Second-Catcher" Simplifies Automatic Control and Reduces Maximum Range of Error

PIONEER in the practical application of automatic frequency control to the widely scattered plants of an extensive electric power system, the Southern California Edison Company is maintaining its system speed within 0.2 sec. of standard observatory time under all normal load changes. Since the first relatively crude device was placed in service early in the fall of 1927 at the Long Beach steam plant, the engineers of the company's steam generation department have constantly and rapidly improved both equipment and operating procedure. Information on this equipment has been published in ELECTRICAL WEST (pp. 397-9, May 15, 1929) and in *Electrical World* (pp. 267-70, Aug. 10, 1929). Major details concerning the "second-catcher," the latest improvement, are given in the following paragraphs.



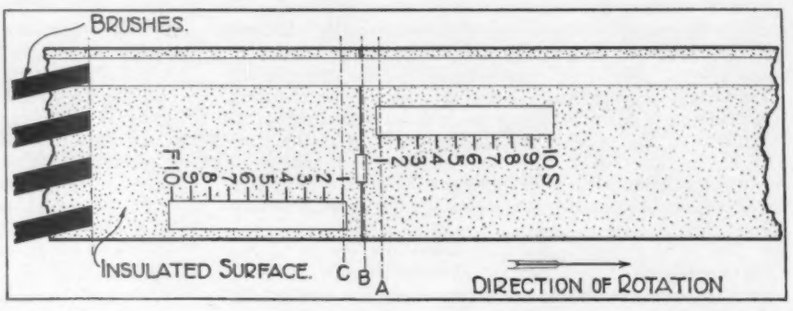
The "second-catcher," a device for matching speed-time and pendulum-time and biasing an automatic frequency controller accordingly

The "second-catcher" as it has been called, and which is shown in the accompanying illustration is a mechanism for matching power system frequency or "speed-time" with pendulum-time. The second-catcher is used at the Long Beach steam plant to direct impulses to bias the automatic frequency controller to effectually maintain correct speed-time. The device was conceived and suggested by F. G. Philo, superintendent of steam generation, Southern California Edison Company.

Edison system regulation is transferred back and forth between the Big Creek hydro plants and the Long Beach steam plants, depending upon loading conditions. When the system regulation is entrusted to the steam plants, the system frequency is controlled automatically by a proportional step controller which sends impulses to the turbine governor motor. System speed-time is compared with U. S. Bureau of Standards time by means of a pendulum-operated master clock. Impulses are sent from the master clock (on the minute) to the "second catcher" which utilizes the one-minute-interval impulses to bias the automatic frequency controller to compensate for any accumulated error in speed-time.

The second catcher consists of a drum 15 in. in circumference driven by a small synchronous motor. This drum revolves exactly one r.p.m. at normal system speed of 50 cycles per second. When the minute-impulse from the master clock matches the minute-line on the second catcher drum, an impulse is sent to the automatic controller which will restore the frequency controller bias to neutral, or to the 50-cycle balance.

If system speed-time is slow 0.2 sec. or more, the impulse from the master clock will be received when the slow segment of the drum of the second catcher is in the circuit, and thus the impulse will be directed to bias the automatic controller to maintain 50.05-cycle speed. This bias will continue until speed-time is restored to about 0.1 sec. slow at which moment the impulse will be directed to the neutral bias and the automatic controller again will attempt to maintain 50-cycle speed. If the system speed-time error becomes 0.2 sec. or more fast the reverse operation takes place. This mechanism operates quite efficiently and is capable



Developed surface of the "second-catcher" drum. Brushes in position "A" when minute-impulse from pendulum clock finds system speed-time 0.2 sec. slow. Brushes in position "B" when minute-impulse finds speed-time correct within 0.1 sec. Brushes in position "C" when minute-impulse finds speed-time 0.2 sec. fast

of maintaining the speed-time of the entire Edison system within a 0.4-sec. range under all normal load changes.

Extensive installation of synchronous motor-driven clocks for home and industrial use is stimulating greater interest in the subject of automatic control of frequency to maintain accurate speed-time. Still further improvements in automatic frequency control equipment are under investigation by Edison plant engineers.

▼ ▼ ▼

Edison Steam-Electric Generating Station Sets High Efficiency Mark for 1929

OUT of a system total output of 3,162,988,030 kw.-hr. for 1929, the Long Beach steam station of the Southern California Edison Company generated 1,309,522,170 *net* kw.-hr., 40 per cent of the system output. Practically all of this power was generated from natural gas fuel, less than 1 per cent of the steam output being from oil as fuel. Nearly 16,000,000 cu.ft. of natural gas was used.

The average efficiency of the Long Beach station with its high percentage of natural gas fuel is considered remarkable in view of the reduced boiler efficiencies experienced with this gas because of its high hydrogen content. Better boiler efficiencies and consequently better over-all plant efficiencies are possible of attainment with coal or oil fuels. Conservation of the abundant supply of natural gas in southern California dictates its present preference for steam-electric generating plants.

Records carefully kept show the average heat value of the Long Beach fuel supply during 1929 to have been 1,194 B.t.u. per cubic foot. Under this basic condition the average efficiency of the 1929 Long Beach output was 14,373 B.t.u. per *net* kw.-hr. Reduced to the basis of the so-called "standard barrel" of fuel oil with its designated heating value of 6,250,000 B.t.u., the equivalent of this figure becomes 434.85 *net* kw.-hr. per barrel of fuel oil.

Operating Summary for 1929

A resumé of statistics concerning the 1929 operation of the Long Beach station is given in the following tabulations:

Station Summary

Total capacity, kw.	315,000.00
Net output, kw.-hr.	1,309,522,170.00
Average hourly net load, kw.	149,490.00
Fuel used—total in equivalent oil, bbl.	3,011,541.00*
Natural gas, cu.ft.	15,637,795,600.00*
Fuel oil, bbl.	24,029.00*
Average net output per bbl., kw.-hr.	434.85
Average B.t.u. per net kw.-hr.	14,373.00

* Includes miscellaneous fuel and shrinkage amounting to 247 equivalent barrels, which are charged against the station.

Plant No. 1*, Units 1 to 6, Inclusive

Total capacity, kw.	70,000.00
Net output, kw.-hr.	916,000.00
Average hourly net load, kw.	5,090.00
Total fuel in equivalent oil, bbl.	11,750.00
Average net output per bbl., kw.-hr.	77.96
Average B.t.u. per net kw.-hr.	80,169.00

* This plant maintained as cold standby, and operated only 17 days during 1929. Actual generation during that period was 1,574,300 kw.-hr., but the use of 658,300 kw.-hr. for auxiliary power during standby periods reduced the net output to 916,000 kw.-hr.

Plant No. 2, Units 7 to 9, Inclusive

Total capacity, kw.	145,000.00
Net output, kw.-hr.	594,594,230.00
Average hourly net load, kw.	77,400.00
Total fuel in equivalent oil, bbl.	1,531,580.00
Average net output per bbl., kw.-hr.	388.22
Average B.t.u. per net kw.-hr.	16,099.00

Plant No 3, Unit No. 10

Total capacity, kw.	100,000.00
Net output, kw.-hr.	714,011,940.00
Average hourly net load, kw.	89,350.00
Total fuel in equivalent oil, bbl.	1,467,827.00
Average net output per bbl., kw.	486.44
Average B.t.u. per net kw.-hr.	12,848.00

The second 100,000-kw. steam-electric generating unit, No. 11, now is in service in plant No. 3, making the total generating capacity of the Long Beach steam station 415,000 kw.

▼

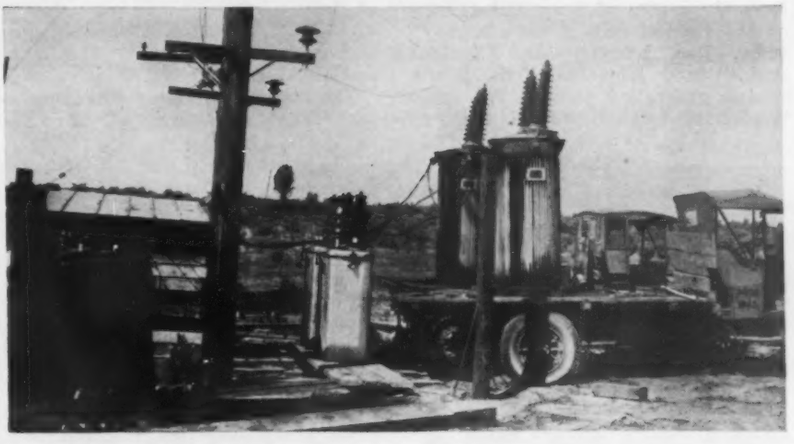
A Practical Application of "Safety First"

J. E. Jordan, superintendent of distribution, El Paso Electric Company, El Paso, Texas, has instituted the following practice in accident prevention work: A safety guard has been appointed in each of the line crews, who in each instance is a man old at the game and a "safety first" enthusiast. This guard watches the other men in the crew, warning them against unwise practices and instructing them regarding the safest way to perform each task.

In addition to this, the safety guard makes a written report each week, setting forth various unsafe practices he has had occasion to observe and commenting upon methods to effect greater safety. These reports are analyzed and the safety measures suggested put into practice. The result is that all men in the department are kept keenly interested in accident prevention and constantly are devising new ways to promote greater safety.

▼ ▼ ▼

And Now It's Truck-Mounted Transformers



WHEN service calls, everything else must wait. The accompanying illustration shows an emergency installation of transformers made near Milner, Idaho, by the Idaho Power Company, to serve the Derbon Construction Company on its big ditch construction job.

Recently it became necessary to replace the two 100-kva. transformers normally in service at this station with three 30-kva. transformers. A few hours after the change had been made, one of the new 30-kva. units burned out. However, by that time the two 100-kva. units had been loaded on two separate trucks ready to be hauled away. To cut down the interruption to the shortest possible time as far as the construction company's service was concerned, the loaded trucks were backed under the 44-kv. line and the original transformers placed back in service as they stood.

Subsequently another 30-kva. transformer unit arrived to replace the burned out units, thereby relieving the two 100-kva. units.

Mission-Type Architecture Used for Idaho Substation

AN ADDITION to the community in more ways than one is the new Twin Falls (Idaho) substation of the Idaho Power Company. Designed for beauty in appearance, utility in electric service and flexibility in operation, this station reflects credit upon the company and C. E. Boggs, its designing engineer.

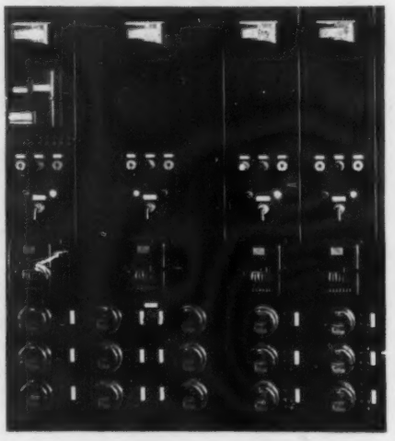
Replacing an outgrown station in the center of town, the new station is at the northern edge of the city about a mile from the center of town and directly on the right-of-way of the company's 44-kv. line between the Thousand Springs and Shoshone Falls hydro-electric generating plants. The selection of this location provided not only the additional space required, but also the opportunity to do away with a two-mile high-tension loop line down into the center of town and made possible the combination of a high-tension switching center and distributing substation.

The accompanying illustrations show several of the interesting features of the station. The two-bay steel switching structure provides for the necessary high-tension oil circuit breakers and disconnecting switches and provides 44-kv. service to the 3,750-kva. G. E. station transformer bank. This is essentially a transmission unit.

The station building itself houses a 4-kv. double bus and all of the related distribution equipment including oil circuit breakers, auxiliary apparatus, voltage regulators, street-lighting transformers and control equipment. The 4-kv. buses are carried in a concrete bus structure against which are lined up the regulators and service transformers, thus providing direct and short connections to the buses.

All feeder circuits are provided with automatic reclosing equipment in the interest of expeditious emergency operation.

East elevation of new Twin Falls substation of Idaho Power Company

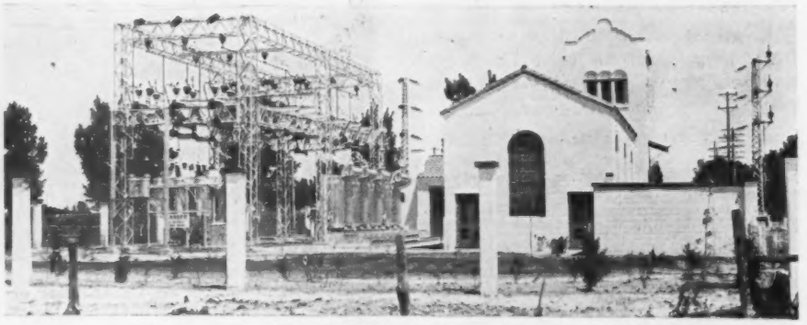


A portion of the all-steel switchboard indicating the type and amount of control and protective equipment used for the various circuits

Control equipment is housed in a separate room and the all-steel Westinghouse switch and control board is rated as one of the most striking features of the electrical installation at this station. The all-steel board seems rapidly to be coming into common use and its use here indicates the modernity of the station design. All of the vertical wiring on the back of the steel switchboard panels is enclosed in steel gutters at the edge of the panels, only the short horizontal runs being exposed.

The substation building itself rests upon a solid rock foundation, and is entirely of reinforced concrete including the roof and roof trusses. The true character of poured concrete was carefully retained and the form marks purposely were made to show. No plastering was permitted, it being the belief of the designer that the surface texture of properly mixed and properly placed concrete is more pleasing in appear-

Regulator aisle-looking toward the control room of Twin Falls substation. Note the modernistic lighting fixtures



West elevation of Twin Falls substation of Idaho Power Company showing the 44-kv. switch rack and the high-tension line looped through the station with a bypassing jumper line along the street in front of the building

ance than a refinished surface. The drab color of concrete was whitened by a paint coating consisting principally of white cement, thus retaining the natural concrete texture.

The interior finish is in keeping with the architecture of the building. The floors are finished with a glaze in mottled red, brown and green colors produced by combining ground silicate sand, diatomaceous earth, together with mineral colors and using magnesite as the active setting agent. Interior stucco plastered smooth, waxed and polished, was used for the wainscoting, topped with a mosaic tile trim.

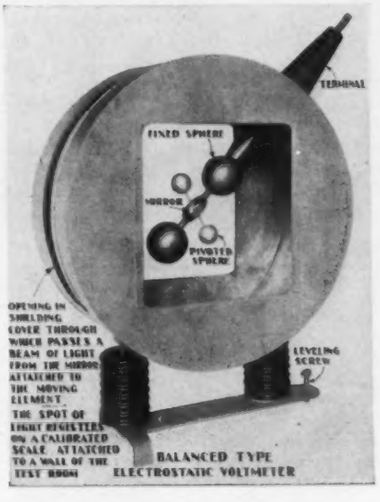
Wall brackets and a single central fixture in the ceiling of the lobby, all of modernistic design, comprise the interior lighting layout. Four 1,000-watt floodlight projectors provide sightly exterior illumination. The acre of ground upon which the substation is situated has been carefully landscaped with areas of lawn and shrubbery. Automatic sprinklers serve the lawn areas. The setting is completed by concrete walls and fences with concrete posts which entirely enclose the property.

▼

An Electrostatic Voltmeter for Laboratory Use

An electrostatic voltmeter developed by the Delta-Star Electric Company for laboratory application is shown in the accompanying illustration. This instrument is designed to operate on the principle of repulsion of similar charges and is for voltages up to 100,000.

The fixed spheres are connected to the potential to be measured and the shaft of the pivoted sphere assumes a corresponding position of balance. The shaft of the pivoted spheres carries a galvanometer mirror from which is reflected a beam of light which passes out through the side of the device to a scale mounted on the wall of the laboratory. With the instrument the root-mean-square or the peak voltage may be measured, depending upon the method of connection to the service.

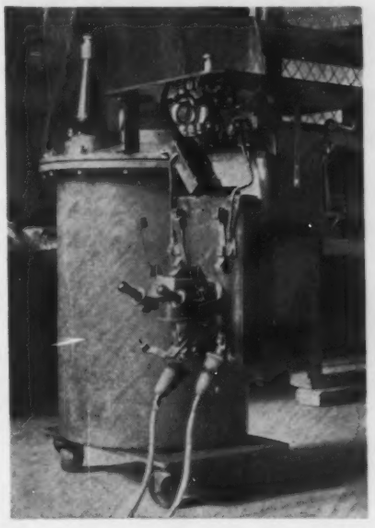

TERMINAL
FIXED SPHERE
MIRROR
PIVOTED SPHERE
OPENING IN SHIELDING COVER THROUGH WHICH PASSES A BEAM OF LIGHT FROM THE MIRROR ATTACHED TO THE MOVING ELEMENT
THE SPOT OF LIGHT REGISTERS ON A CALIBRATED SCALE ATTACHED TO A WALL OF THE TEST ROOM
LEVELING SCREW
BALANCED TYPE ELECTROSTATIC VOLTMETER

Effective Safety Barrier for Test Transformer

By A. D. IRION, Test Engineer, Shop-Test Department, Southern California Edison Company.

To protect the operator against possible and dangerous contact with the high-tension terminals of 30-kv. testing transformers, the special barrier shown in the accompanying illustrations is most effective. When the barrier is in the upraised position it is impossible to energize the transformer and when the barrier is in the lower or safety position it is practically impossible to make accidental contact with the high-tension terminals.

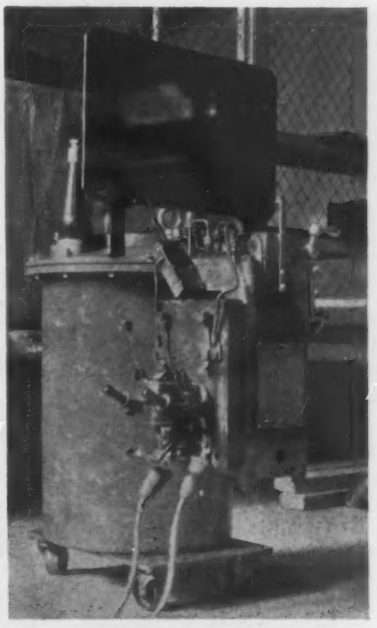
The small testing transformer shown is used for various purposes, particularly for routine testing of rubber gloves, rubber blankets, sleeves, instrument transformers, various coils and special windings, for breakdown tests on transformer and switch oil, and other similar uses. The set is capable of producing a voltage of 30 kv. and is a standard piece of apparatus equipped with a 100-per-cent voltage regulator.



Safety barrier on 30-kv. test transformer in operating position completely covering high-tension terminals

To prevent the operator from touching the high-tension terminals while the transformer is energized the hard rubber barrier shown is hinge mounted to a pair of brackets held in place by two of the cover bolts. This barrier is attached to the equipment in such a way that there is no interference whatever, either with the apparatus under test or with the control equipment of the testing transformer. The barrier is mechanically interlocked with a single-pole plunger type safety switch which is cut into the primary circuit of the transformer. Should the operator desire to change any of the test connections it is necessary to move the barrier to accomplish the change and of course that automatically de-energizes the transformer.

The cost of this safety device is almost negligible and a long period of use in routine shop testing has shown that it is entirely foolproof and reliable.



Safety barrier raised, operates plunger switch de-energizing transformer.

This device exemplifies one of the many safety methods employed by the Southern California Edison Company in its shops to protect human life as well as equipment. It is one of the features that help the employee to maintain a 100-per-cent safety record.

▼

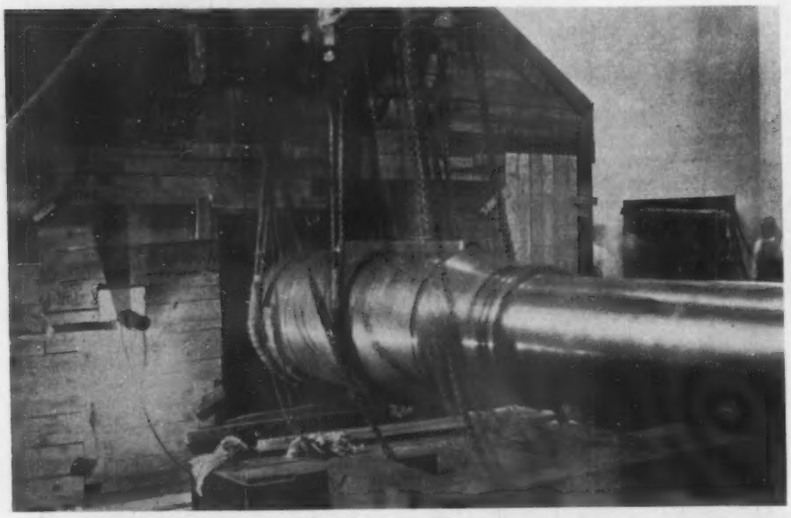
Adieu to the Well-Known Choke Coil?

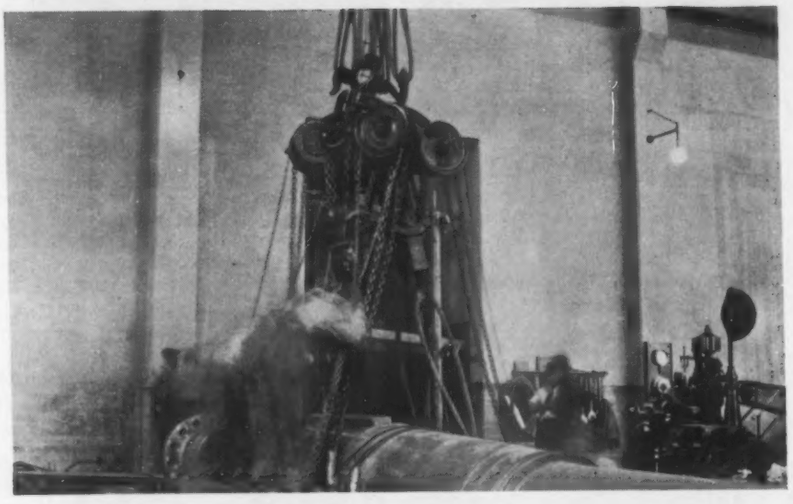
As a result of laboratory investigations and field tests made possible with modern artificial lightning generators and the high-speed recording qualities of the cathode-ray oscillograph, it has been determined that choke coils are not useful accessories to lightning-arrester installations on transmission and distribution systems. For more than 30 years it has been common practice in the electric service industry to use choke coils in connection with lightning arresters for the protection of lines and apparatus against damage caused by lightning and high voltage surges.

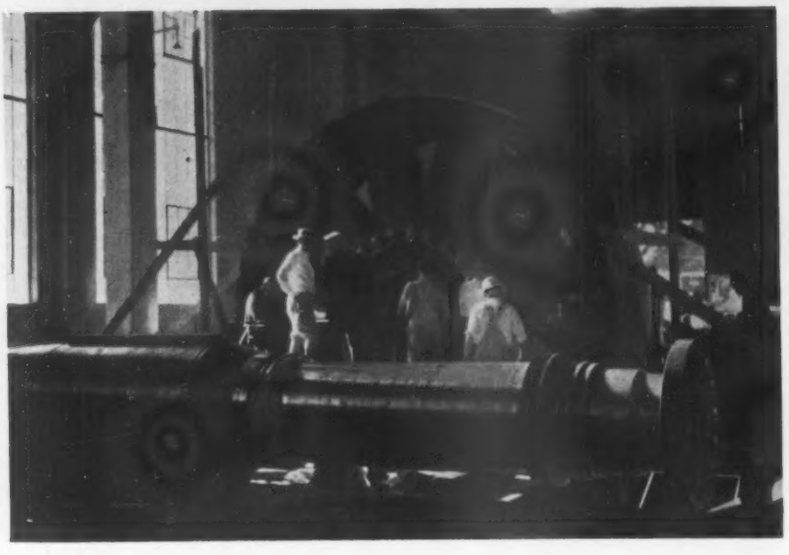
Mathematical calculations showed in general that such coils assisted the lightning arresters by reflecting and retarding incoming voltage waves. Now, however, it has been determined that these mathematical studies were based upon uncertain assumptions recently disproved. As a consequence the General Electric Company has announced that it has discontinued the manufacture and sale of choke coils.

Record Unit Assembled Under Difficulties at Southern California Hydro Plant

By J. P. STRATFORD,
Junior Electrical Engineer, Design and Construction Division, Bureau of Power and Light, City of Los Angeles







IN MANY of its physical dimensions the fifth and last generating unit to go into the Bureau's San Francisquito Power Plant No. 1 set some records for size. This unit is rated at 25,000 kva., 6.6 kv., and is designed to operate under a gross head of 943 ft., a head relatively low for the capacity of the unit, hence the large size. In generating capacity the new unit is more than double that of any two of the other four units, and brings the plant capacity up to its intended ultimate, 72,657 kva. Original plans called for six of the smaller units, but when the time came to bring the plant to its full generating capacity, economics favored the one larger unit which was completed and placed in operation on Dec. 12, 1928.

Each of the two impulse wheels of the unit is designed to develop 16,100 hp. and sets a record for size, being 176 in. in diameter, appreciably surpassing the former record of 156 in. Each bucket weighs practically a half-ton and the two 14-in. nozzles are 3 in. larger than the next nearest size on record. The shaft has a maximum diameter of 38 in. and weighs 40.5 tons, while the cast steel rotor spider has an outside diameter of 208¾ in. and weighs 74.7 tons.

Chief among the erection difficulties attending the assembly of these large parts were the restricted head room available in the power house building and the limited capacity of the crane which was rated at 70 tons maximum lift. Thus it was necessary to place the rotor in position within its foundation plates and to heat it in that position to permit the horizontal insertion of the shaft. To expand the rotor hub to permit insertion of the shaft it was necessary to raise the temperature of the rotor to 125 deg. C. Three means of heating were employed—magnetic induction, hot air and radiation. In the induction method, 24 turns of 500,000-circ.mil bare copper cable were placed around the periphery of the rotor and insulated from it by two layers of 1/16-in. sheet asbestos. This winding was energized at 220 volts and carried 145 amp. Additional heat was provided by radiation from resistance-type ribbon heaters and hot-air blowers. To reduce heat loss from radiation a housing was built over the rotor and

▼

THREE stages in the assembling of a 38-in. shaft in a 208-in. rotor of a water-wheel generator at San Francisquito Power House No. 1 of the Los Angeles Bureau of Power and Light. Lower view shows rotor in place, indicating its size. Center view shows group of chain blocks on crane hook making initial lift on shaft. At the top may be seen the shaft being inserted into the rotor hub through a door in the heat-insulated housing.

the heating equipment. This housing was lined on the inside with corrugated iron and on the outside with wood sheeting. Doors advantageously placed facilitated the shaft installation with a minimum heat loss.

To reduce such stresses to a minimum considerable time and effort were spent in attempting to maintain the temperature constant throughout all parts of the spider. Ten degrees was established as a maximum temperature variation between any two points. On this basis it was found necessary to place a horizontal baffle of corrugated iron across the housing dividing it into two sections. This reduced the heat travel to the top of the housing sufficiently to maintain the desired limited temperature gradient between top and bottom of the mass. Ten thermocouples inserted into convenient bolt holes gave readings indicative of internal temperature, while numerous thermometers inserted through the wall of the housing at various points gave indications of the air temperatures. With these two sets of readings available it was possible to shift the resistance heaters and hot air blowers as necessary in order to maintain uniform heating. The rotor was brought up to the desired temperature and corresponding hub clearance after 113 hours 15 minutes of heat application.

Because of the limited capacity of the power house crane and the restricted headroom, it was necessary to "float" the shaft into place instead of utilizing the more convenient method of dropping it into place vertically. The difficulty of floating it into place without jamming was overcome by lifting the shaft with slings attached to chain blocks carried on the main crane hook. With this arrangement, the shaft could be maneuvered at will to prevent binding by adjusting the various blocks as the crane, assisted by block and tackle, "floated" the shaft into place. The shaft first was picked up at midpoint and inserted into the rotor as far as possible and then the slings were changed to straddle the rotor housing.

Preparatory to the insertion of the shaft a high-pressure ram was set up to back the shaft out of the rotor in the event of its jamming. This precaution proved its worth because on the initial attempt the shaft did jam and had to be backed out and started over again. Had the ram not been available it is probable that it would have been impossible to remove the shaft rapidly enough to have prevented the hub from shrinking and gripping the shaft incorrectly. Then the problem would have been complicated.

A total of one hour and twenty minutes' time was required to place the shaft in a final position and during this period the entire heat was left on to minimize the resulting temperature drop in the rotor hub. At the beginning of the insertion, the hub diameter was 0.035 in. greater than the shaft diameter.

To prevent the entire assembly from cooling too rapidly after the shaft had been placed, the heat was left on full for a few hours and then decreased to zero over a period of 18 hours. By that time the shaft and spider had reached nearly the same temperature and the entire mass had cooled to a degree sufficient to permit the safe removal of the housing.

▼

Outdoor Annunciator Shows Breaker Operations

At its Perris substation The Southern Sierras Power Company is utilizing to good advantage a simple and economical annunciator for the purpose of indicating the operation of any of the oil circuit breakers in the station. This piece of equipment was devised by the company's own engineers and its main operating parts consist of two eight-drop annunciator units mounted together in a weatherproof galvanized sheet-metal cabinet.

Reset controls have been added so that it is possible to reset the drops without opening the cover of the cabinet. Each drop is connected to the automatic trip pallet switch on its corresponding oil circuit breaker and thus its circuit is closed only upon the automatic tripping of the related circuit breaker. Each drop is labeled with the corresponding number of its oil circuit breaker so that it is simple to recognize immediately which of the breakers has functioned.

The cabinet is placed directly in front of the fence gate which gives access to the substation yard and the "drops" are sufficiently large in size that they may be read at a glance. Further to enhance the usefulness of this annunciator, automobile dash-lamp fixtures have been mounted inside the protective cabinet, one on each of the eight-drop units, to provide proper illumination for night-time service. An auxiliary relay has been provided and is so connected that upon the operation of any of the drops the lamp illuminating that particular group of drops is connected to an external battery circuit. This illumination feature affords good visibility at night and saves considerable time should the operator respond to his alarm bells without his flashlight.

NEW BOOKS
for the Engineer

ELECTRIC SYSTEM HANDBOOK, Clarence Herbert Sanderson, editor-in-chief, assistant electrical engineer, New York Edison Company. First edition; 1,167 pages; illustrated. Published 1930 by McGraw-Hill Book Company, Inc., New York. Price $5. For sale by Book Department, McGraw-Hill Company of California, 883 Mission St., San Francisco.—This reference work describes the component parts of the electric generating, transmission and distributing system as a whole and discusses in logical sequence the major features of design and operation. It is not highly technical in its phraseology and should serve almost equally well the student engineer, plant operator, inspector, maintenance or test man, and the engineering draftsman. Higher mathematics is omitted and technical expressions are well explained. Divided into fourteen sections, the book deals successively with electrical energy and its transmission, auxiliary electrical equipment, switchboards, motors, generating stations, the transmission system, a.c. substations, railway substations, d.c. substations for light and power, distribution, protection of electrical apparatus and circuits, inspection and maintenance, engineering tables, and standard definitions.

DIELECTRIC PHENOMENA IN HIGH-VOLTAGE ENGINEERING, by F. W. Peek, Jr., General Electric Company, Schenectady, N. Y. Third edition; cloth bound; 6 x 9 in.; 410 pages; 267 illustrations; numerous tabulations. Published by McGraw-Hill Book Company, Inc., New York, N. Y. For sale by Book Department, McGraw-Hill Company of California, 883 Mission St., San Francisco. Price $5.—Neither the author nor his work needs introduction to the electrical engineering fraternity. Suffice it to say that the object of the author in preparing the original work was to give the properties of gaseous, liquid and solid insulating materials, and to give methods of utilizing such properties to the best advantage in the solution of the problems of high-voltage engineering. This edition enlarges and brings up to date the entire text in line with the revelations of research made during the past few years. Many new data have been added, particularly in the fields of lightning, corona studies, impulse breakdown of gases and insulation, spark-over voltages of different gaps and insulators, and other facts representing the results of field work.

BULLETINS of the University of Washington Engineering Experiment Station recently received include:

BULLETIN No. 50—Transmission Line Design, Part IV, Choice of Line Voltage and Conductor Size, by Edgar Allen Loew, professor of electrical engineering. Published April 15, 1929, 27 pages. Price 30 cents.

BULLETIN No. 51—Suppression of Pipe Intake Losses by Various Degrees of Rounding, by James Baker Hamilton, assistant professor of civil engineering. Published Nov. 15, 1929; 35 pages. Price 35 cents.

REPORT No. 1—The Pulp and Paper Industry of the Pacific Northwest, by Henry Kreitzer Benson, professor of chemical engineering. Published March 15, 1929; 89 pages. Price 75 cents.

REPORT No. 2—Iron and Steel Manufacture in Washington, Oregon, California and Utah, by Joseph Daniels, professor of mining engineering and metallurgy. Published Dec. 15, 1929; 69 pages. Price 65 cents.

All of these are 6 x 9 in. in size. Inquiries should be addressed to the Director, Engineering Experiment Station, University of Washington, Seattle.

PRINCIPLES OF RADIO, by Keith Henney, M.A., Director of Radio Broadcast Laboratory, Member I.R.E. Cloth bound; 5½ x 8 in.; 477 pages; 306 illustrations. Published 1929 by John Wiley & Sons, Inc., New York. Price $3.50.—This book is designed to serve as a textbook on the subject of radio, its fundamental underlying principles and the functioning of the various pieces of equipment involved in radio circuits. As a text it should serve the practical man who would use it without the guidance of an instructor and also it should be of service in class work where the goal is a practical understanding of radio circuits and equipment rather than scientific research. The first third of the book is devoted to a discussion of the fundamentals of the electric circuit, leading up to the main subject. Experiments are described and numerous practical problems enliven the text.

ELECTRON PHYSICS, by J. Barton Hoag, Ph. D., Instructor in Physics, University of Chicago. Cloth bound; 6 x 9 in.; 208 pages; illustrated; 10 tables; 60 problems; 23 experiments. Published 1929 by D. Van Nostrand Company, Inc., New York. Price $3.—This book is designed to serve as a text and as a guide in the performance of certain experiments, the results of which should give the student an understanding of the newer physical concepts. Its chapters deal with the passage of electricity through gases at atmospheric pressure; the electron; the emission of electricity from solids; electron phenomena; three- and four-electrode vacuum tubes; the passage of electricity through gases at reduced pressures; properties of alpha, beta and gamma rays; the absorption of various rays; and radioactive substances. Five appendices deal with technique and specific equipment. Practically no calculus is used.

Ideas for the Contractor

LOOK IN YOUR MIRROR!

The Much Sought Answer to the Contractor's Problems Lies in What He Will Do for Himself and His Fellows Through His Association

By GEORGE ELDRIDGE*

DESPITE the fact that assistance has been given and an improved condition prevails in many districts, there are as yet a number of contractors who question the value of the association.

Every association administration is faced with a certain amount of loss of membership from men whose only reason for dropping out is that "the association has never done anything for them" or "they paid their dues but never got anything for them."

An association is not a business. It doesn't sell a member a thing for his dues.

An association is just what its name implies —a number of people associated together to do certain things. In other words, an association is not engaged in manufacturing, wholesaling or retailing. Its sole job is to do things as a collective body which the members would never be able to do as individuals.

If the association principles are worth while they should be supported by money and by time. If the association is not carrying out these principles, then the membership should select new leaders who will carry them out.

It may be difficult, perhaps, for a man whose work never gets beyond the confines of his home town to become very much excited by state progress. Very probably he thinks in terms of his own local problems. These are the problems he has to face day in and day out. They are very real to him, whereas state problems are not so close, and therefore seem less vital.

Such men, however, must learn that no town has its individual problems. The problems of one place are the problems of every place. Human nature is the same everywhere. In other words, the local problem is after all a big state problem.

If there is no effort made in a national or state-wide way to find a solution to such a problem, it is hardly likely that many localities will find an answer. However, national or state-wide solutions to such problems, be they complete or only partial, have a value in that they may be employed locally with some certainty of success.

Localities that try to solve their own problems without any outside guidance are just as likely to get in deeper as they are to get out of trouble.

National and state associations are necessary if the problems of the group are to secure any national consideration. We need members,—members who will join not with the thought they are buying something, but members who are anxious that the electrical contractors have a national voice in industry councils, who are anxious that the contractors' problems be given national consideration.

The reasons for the sad state of affairs and the unsound condition of many contractors are well known. All talk about these things, but few do anything.

We have talked about overhead and we know it exists; we have also talked about profit and many know it does not exist, or if so they have not found it. We have cried about the jobber, the manufacturer and others for their unwise practices but only at rare and infrequent intervals have we used the influence at our command to bring about an improved condition. Nor have we always been sure first that our own practices are wise.

I am fully convinced that the one thing that we need and need badly is a larger membership if we are going to do the job that is ahead of us. I can only say that the man you look at in the mirror in the morning is the only one responsible.

This association is not a machine that will function without assistance. Rather it becomes a powerful machine that will function only when each unit or contractor is ready to serve. When you look in the glass next time, ask if that fellow you see there is doing everything he can to make contractors happy and the business better.

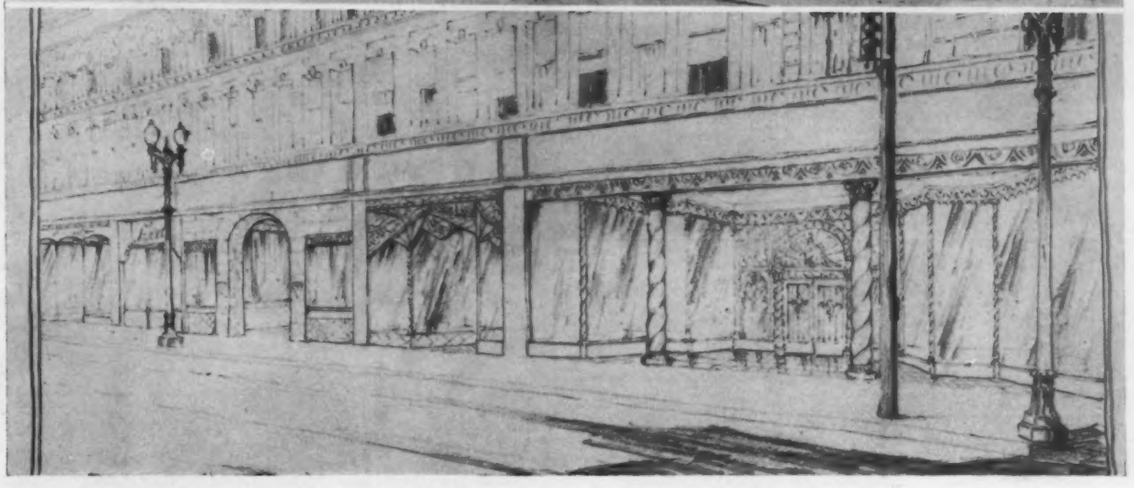
**Presented at the convention of the California Electragists, Bakersfield, and endorsed by unanimous motion from the floor*

TURN WASTE INTO PAY

Daylight Intensities Demand Higher Mounting Heights and Usually There Is Space That Is Going to Waste to Provide It

Daylight intensities in windows demand high wattage units, and these if too close to the merchandise create heat which damages wax figures and merchandise. Clark Baker, chairman of the educational lighting committee of the Lighting Bureau, P.C.E.A., suggests the use of waste space found above practically all store windows for higher mounting of units, more ventilation and better daylighted windows. At the bottom of the page an artist gives his conception of the new higher front windows possible under the plan

Modern art store fronts are becoming more prevalent. They are at their best when the full height from just above the street level to store ceiling is utilized in the front. This allows for the mounting of high intensity window units without damage to the merchandise



Lamplight for

Persian Palaces for the Display of Sumptuous Motor Cars Require More Than the Flickering Flames of Omar's Day

The "arches of Ctesiphon" in rich colors are reflected by the waters of Oakland's Lake Merritt during the day

TEMPLES of commerce. The term is no idle simile, for indeed commerce in automobiles has given the country showrooms to which the fondest dreams of kings could never have attained in Persia's romantic past. Particularly rich in architecture and decoration, enough so to be a tradition unto themselves, are the showrooms of Earl C. Anthony, Inc. In these the elegant Packard motor vehicles are set as in jewel cases for the greater admiration of the motoring public.

There are three of these showrooms —the first in San Francisco, the second in Oakland and the latest, and as yet not wholly complete, in Los Angeles. In fairness it must be said that it was in Los Angeles that the tradition grew, possibly. In the establishment of a new series of show palaces it was developed.

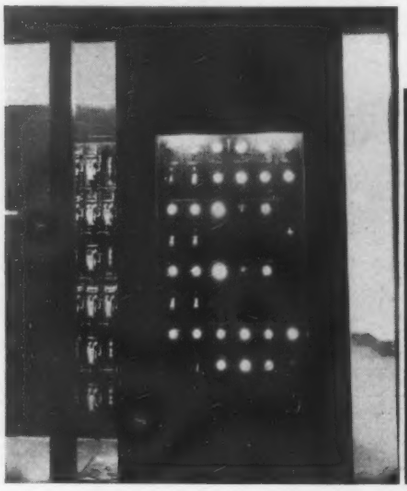
Each showroom is a work of art in its own right. In each the electrical complement is likewise more or less peculiar to it. Certain features of control and lighting effect are similar, to be sure, yet because the architecture is in each case unique, so must the lighting be.

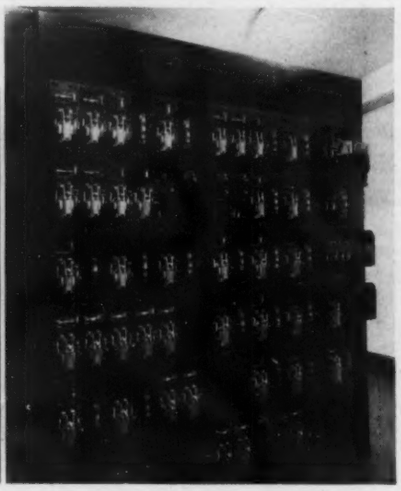
And at night these arches glow with color to fill the lake with jeweled light.

Bernard R. Maybeck, architect for each, given free hand to develop a work of architectural art, placed upon Thomas L. Nudd, electrical engineer, responsibility for attaining the not-to-be-questioned desired effect. It became the task of Mr. Nudd to meet the artistic specifications. If there were to be shadows in certain places they must be there and in the right color. It may be said of both Mr. Maybeck and Mr. Nudd that the result wholly justifies the methods. No more striking and dramatic showrooms than these exist in any commercial enterprise in the West.

At the Oakland showroom certain particularly unusual features prevail. In many ways, because of its setting on Lake Merritt, perhaps, its architectural and lighting provisions are superior to those of the other showrooms. Certainly Mr. Anthony must have been particular to know just what the effect would be for the architects and engineers made up a model of the building to one-quarter scale. In this was mounted miniature reflector equipment using 40-watt lamps, and with proper colored gelatins the correct shadow effects were produced on the interior and exterior arches.

A cove at each side of each arch conceals two long Neon tubes which bathe the inner surface with red

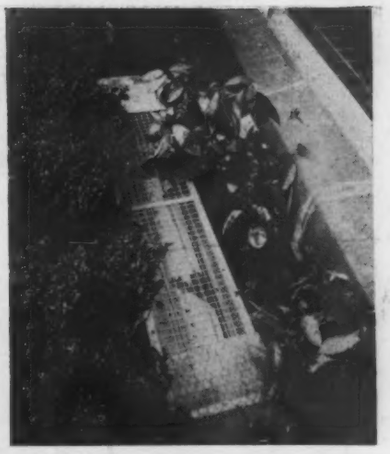




Controlling all lighting at the Oakland showroom is the manual switching panel (left), the banks of dimmers, motor-driven by means of excentric shafts (center), and the contactor panel (right)

Khosru's Temples

—by Which Earl C. Anthony Creates an Atmosphere of Elegance and Quality



A mercury-vapor unit is concealed in the shrubbery below the corner arches and plays on shrubs and arch alike. It is specially housed in a weather-proof container

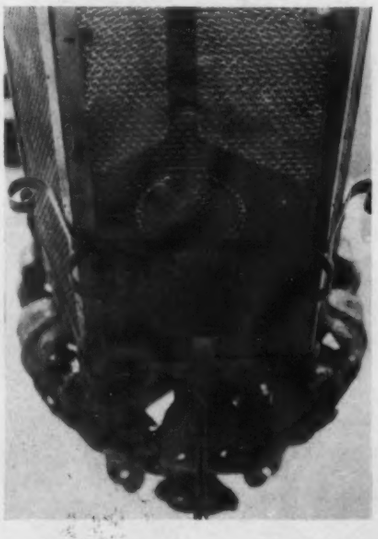
This model was no small undertaking in itself. It stood 9 ft. high and was 7 x 15 ft. in area. Control of the lighting intensity was plotted by the use of 110-volt radio filament rheostats for dimmers in a miniature switchboard. When the lighting was proved to be satisfactory to the automobile executive, the building was erected.

At it stands it is a Persian temple which Kaikhosru might have built at Ctesiphon on the banks of the Tigris. But Kaikhosru had no electricity with which to lamplight his masterpiece.

Contour of the site, a slight incline from the street, was used by the architect to make the display floor of different levels, each 1 ft. higher than the other. This gives perspective to the interior and something of the atmosphere of a spectacle. At the rear wall, framed by a series of massive arches set upon squat blank marble pillars, is a stage. This stage itself is framed by Byzantine twisted pillars and has arches looking out to the rear upon a Maxfield Parrish blue "sky."

Motor cars, set upon these various levels, are displayed to particular advantage. Both the casual passer-by outside and the motorist rushing by get a glimpse of them through the great arched windows. Naturally, too this architectural scheme allows for dramatic lighting effects. The arches of the exterior serve as proscenium arches, themselves colorfully lighted. The interior ceiling, of many arches, is the canvas upon which the artist architect paints his color shadows in a never-ending, never-twice-alike pattern.

In each of the three great arches hangs a huge metal lantern

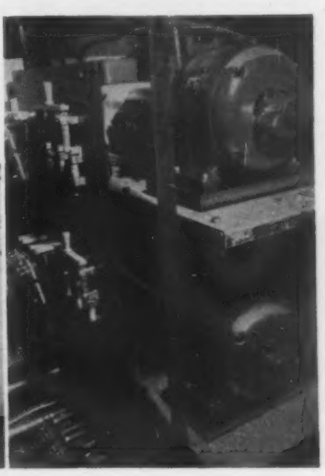


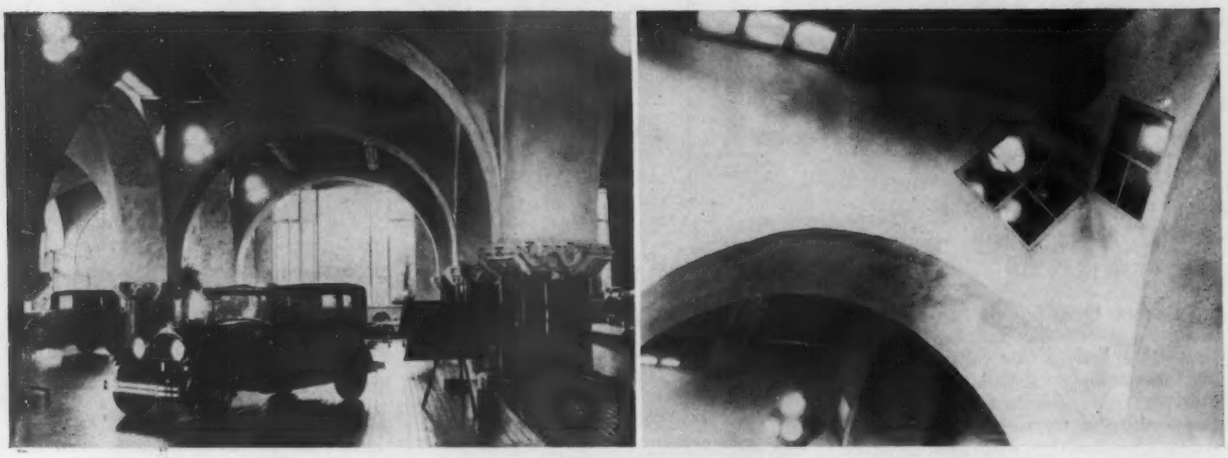
The inside of the lantern is lighted in a color contrasting with that of the arch in which it hangs. The unit is concealed in its base as shown here

Exterior lighting consists first, at the base of the corner arches, of concealed mercury vapor units in the shrubbery. These light the shrubs with a fluorescent color and tint the top of the arches in bluish green. Inside the tower are four 1,000-watt floodlights whose cerulean blue color, obtained by means of a screen of specially tempered glass, contrasts with the floodlighting on the outside of the tower, which reveals its red and yellow tints. On a cast stone lattice work on the south side a rose glow is painted by means of a series of floodlights along a window ledge. From the interior of the upper stories comes the greenish blue light from the mercury vapor units used throughout the shop and service department.

It is to the three large arches in front that the most colorful effect is given. A concealed cove hides two parallel red Neon tubes on each side of the arch, casting a soft glow above. Inside the arch hangs a large metal lantern 20 ft. high made of perforated steel and painted on the inside with aluminum for the better reflection of blue-green or purple light from the concealed unit at the base of the lan-

The Los Angeles showroom has a full theatrical board in the basement. At right are shown two of the motors which drive the dimmer banks





In the Oakland showroom interior arches are constantly bathed with a changing panorama of color from units placed behind glass panels set in the arches, while general lighting comes from amber panels in the soffits of the ceiling beams

ABOVE: *Four 1,000-watt units paint the inside of the tower with cerulean blue against a night sky*

RIGHT: *Arrows point to the lighting panels concealed in the ceiling of the Los Angeles showroom*

BELOW: *The shop and service floors are lighted only by mercury-vapor lights which serve the dual purpose of diffused easy-to-work-in illumination, and at night add a characteristic color note to the building lighting*

tern. Below these arches in the shrubbery are mercury vapor units as already described.

In the interior is a series of monastic arches. General lighting is provided by means of concealed boxes in the ceiling through which amber light passes. General lighting of 12½ foot-candles decreasing to 5 and averaging about 8 foot-candles is obtained throughout the showroom. On the rear of these large ceiling arches are placed diamond shaped panels of glass about 4 ft. square. Behind these and inside the arch are three Wuelker units with tempered bowed glass color screens. These units are of different size to equal the light output from the three colors used. In most cases the blue reflectors are equipped with either 1,500-watt or 1,000-watt lamps, whereas the amber and red are 750-watt and 500-watt units. This compensates for the light absorption by the blue. Lighting on the arches, therefore, is directed by means of these concealed units.

The most unique feature of the showroom is the manner in which the lighting is constantly changed automatically. Each of the lamps is on an individual circuit connected to its dimmer plate on the main switchboard. Each dimmer plate is individually driven by means of a cam mounted on a shaft driven by a variable speed motor. Each series of cams is so arranged that at no time does the color combination repeat itself. There are six 1/6-hp. motors and one ¾-hp. motor driving this dimmer set-up. Each of the motors is set for a different speed and operates through a set of reduction gears to slow the motion of the dimmer action.

The total connected load in lighting in this building is 461 kw., 125 kw. of which is on the display floor.

Because occasionally a spectacle is staged in the showroom when additional lighting and scenic effects must be worked out, this arrangement of lighting has been made particularly flexible. Extra circuits are run to a large pull box in each of the windows in the arches from which the current is distributed to the lamps located there. Two separate receptacles separately

switched at the main board are also provided in each arch for special spots or additional lighting as desired. The space in the arch is large enough for one or two men to conceal themselves with color wheels where they may receive cues for lighting by telephone from the floor.

Time clocks turn on and off both the exterior and interior lighting of this showroom. In order to provide manual control in case of necessity buttons are placed at the entrance by which lighting in various locations may be turned on. At the time of the clock setting, however, the clock arrangement sets the proper relays in motion which take proper relays in motion which take over control of the lighting.

In addition, three-wire circuits run to numerous receptacles at the base of columns controlled by contactors at the main switchboard for remote control of any special lighting apparatus which may be plugged in from that position.

At the San Francisco showroom, which was the first of the three to be completed, lighting is similarly artistic in all its phases. Here, too, mercury vapor units are placed in the shrubbery outside the front arches. Special shadow effects on the carved stone doorway at the head of the stairs leading to the office, to show the depth of the carving, indicate one of the niceties worked up by the engineer in conjunction with the architect.

In this showroom border lights extended in large coffers from the ceiling are used in the windows. Large vases on the balcony are used to conceal units which throw a magenta glow on the ceiling of the showroom. Concealed Neon tubing over the doorways casts a rose glow around the setting of the door.

As in the Oakland installation, the San Francisco lighting is controlled from a switchboard by means of dimmers on a bell crank or excentric shaft arrangement. The San Francisco arrangement is more in the form of a flasher with different timing set for different light units. These likewise are actuated by a clock at dusk and turned off at a prescribed hour at night.

Three large lanterns hang in the arches of the front windows of the San Francisco showroom. These are fabricated of perforated steel, but being inside the building are lined with colored silk and lighted from within to complement the interior color scheme.

The Los Angeles showroom is the latest of these new showrooms to be built. As yet one wing of the building remains to be completed after street widening on one end of the building definitely determines the property line. This showroom is on Figuero St., the automobile row of Los Angeles. In this building the high ceiling is of a simple beam finish with tall ornamental pillars at intervals. In this showroom, therefore, the lighting is concealed in panels between beams of the ceiling decoration. The light in this case is provided by means of 500-watt reflectors behind Holophane plates designed to spread light over the area. Pyrex glass color screens have been used on the reflectors above the glass plates. Some trouble has been experienced with the blue due to the high absorption of heat.

Here the lighting is controlled similarly to that of the San Francisco showroom. For daytime lighting of the back areas of the showroom switches from the floor operate relays which through contactors turn on banks of amber lights for daytime use. Regardless of the position of the push button controlling this daytime lighting at 5 o'clock, the lights go on to the dimming circuits by automatic throw-over relays.

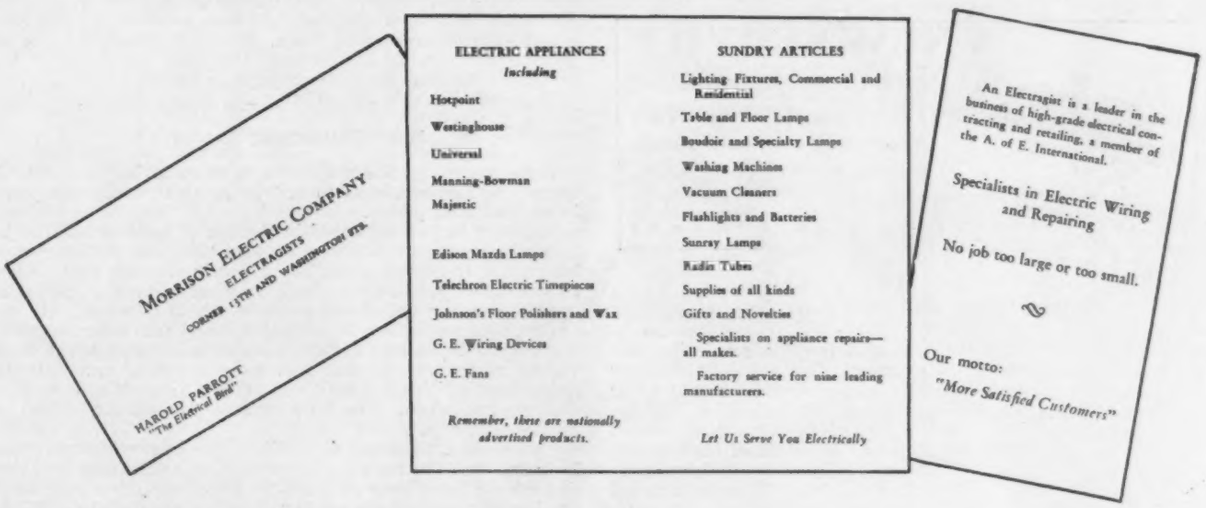
The scheme of lighting here follows the cycle of the day. General lighting of amber light remains on for fifteen minues, following which the amber and blue dim out and a magenta effect is left on for a few seconds. Then the red starts out and evening colors grow until a full moonlight blue comes on. Under general lighting 8 foot-candle intensity is provided. Under the blue 6 foot-candles are provided.

As with each of the other showrooms, manual operation of the switchboard is possible for special gala occasions. The color changing apparatus on the main switchboard at the Los Angeles showroom is much simpler than at the Oakland showroom. Here three 1-hp., 1,750-r.p.m., 220-volt, three-phase motors of constant speed are used to drive the three bell cranks, one each for the red, blue and amber lamp groups.

The complete wiring installations at the three showroms were made as follows: The elaborate Oakland showroom was wired by the Kenyon Electric Company, Oakland. The wiring at the San Francisco showroom was installed by the H. S. Tittle Company, of San Francisco. In Los Angeles the installation was made by the English Electric Company of that city.

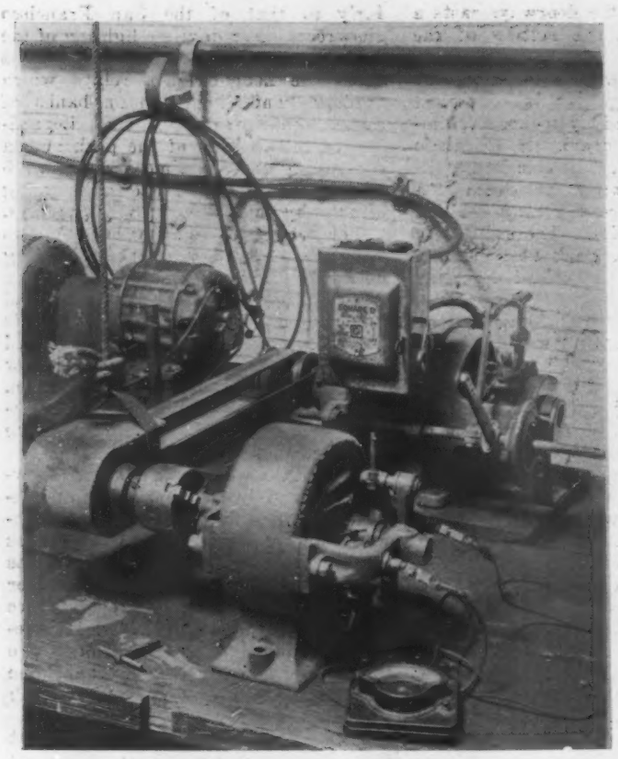
▼ ▼ ▼

Contractor Lists Feature Appliances on His Card



HAROLD PARROTT, "The Electrical Bird," as he calls himself, has designed a novel card for the Morrison Electric Company, Electragists, of Portland, Ore. The full text of the card is reproduced in the illustration above.

It will be noted that nationally advertised products are featured and that the slogan of the Oregon Electragists, namely "An Electragist is a leader in the business of high grade electrical contracting and retailing, a member of the Association of Electragists International," is used on the reverse side of the card.



Variable as to Height and Speed

A SMALL adjustable generator testing set has been made by the shopmen of the California Electric Works, San Diego, for the testing of small generators repaired by the company. As will be seen in the accompanying photograph, a variable speed motor is belted to a chuck-head which can be raised or lowered to suit the shaft height of the generator to be tested. A counterbalance keeps this chuck-head at the height required. The chuck grips the end of the shaft of the small generator. Portable testing instruments are then easily attached to the terminals and the generator tested at various speeds.

▼ ▼ ▼

A NEW SERVICE
Many of our customers have occasional uses for portable electric tools, yet do not feel that they are justified in purchasing them. We have added to our many service facilities a new department, which makes available
RENTAL BY THE DAY
(or for longer periods) of
PORTABLE ELECTRIC TOOLS
INCLUDING
Portable Electric DRILLS
Portable Electric SAWS
Portable Electric SANDERS
Portable Electric GRINDERS
Portable Electric HAMMERS
SECOND HAND TOOLS ACCEPTED AS PART PAYMENT ON PURCHASE OF NEW TOOLS
Please HOllIday 4422 and we will explain this new rental service, and recommend the correct size and type of tool to take care of your particular jobs
PACIFIC ELECTRIC MOTOR COMPANY
DEALERS: BLACK & DECKER PORTABLE ELECTRIC TOOLS

Rent Paves the Way to Sales

PORTABLE electric tools make a profitable side line for many motor shops. Many shops also not only sell new and used portable tools but have inaugurated a rental service which they find pays. Advertised to industries, in the manner shown above, the number of portable tools rented out has increased. Moreover it has been found that one or two rentals of an electric drill, saw, grinder or sander creates a desire for ownership of such a tool which is only gratified by a sale.

Likewise the rental facilities please many industrials in that they can be assured of a tool in case one they own must be put in the shop for repairs.

Several motor dealers also report considerable business during winter months from the rental of home saw outfits for the cutting of wood for heating.

motor

a department for and by Motor Specialists

MODERNIZE MOTORS

A Plan by Which the Industrial Contractor and the Manufacturer May Profit Mutually

HERBERT HOOVER started it. When the engineer-president foresaw the possibility that the late unpleasantness in Wall St. might be felt by industry, he made use of that instrument which had accomplished other commercial miracles for him and for business in the past—the conference. Among the conferences held was one of industrial leaders.

"Gentlemen," said the president, in effect, "what are you willing to do to maintain prosperity?"

As a result of the conference the decision of industry was that 1930 would be an excellent time to do a little housekeeping and revamping.

In the busy years just passed there had been little time for reorganization of plant layout on a really efficient basis. New units and new departments had been put into operation so quickly that not always was the best method used. Now should be the time to bring things up to date, to modernize or else retire the useless or inefficient for equipment newer and better and less costly to operate.

Picking up a cue from this expression of confidence in the future, Louis Kalischer, prominent motor specialist in New York City, decided that this was a movement which the motor industry could well capitalize. This idea developed into a plan really to remotorize industry. So sound was it that not only his own group, the Motor Section of the New York Chapter of Electragists, became interested, but likewise the organized electrical industry in New York City. Full endorsement of the plan has been accorded by the Electrical Association of New York. More than that, this organization, representing all electrical interests, has adopted it as its major activity for 1930. It is to be backed up by a strong selling force, ample advertising and full publicity.

Why Remotorize Industry?

Some years ago the problem was to motorize industry. At that time the task was to sell industries on electric power instead of fuel power.

Industry has so advanced in the use of motors that the job today is to replace motor equipment that was the best of its kind when it was installed but which is obsolete now. Often it is overpowered for its load, or underpowered. Often its speed is wrong for the particular job to be done. Or else perhaps its regulation is poor, its control faulty or unsafe or inefficient. Perhaps a better choice of motor equipment would reduce maximum demand and earn a better rate. Better balancing of load conditions might improve operation. Change-over from direct current to alternating might be highly desirable.

There are a thousand possibilities for improving motor use in industries. In the rush of production and expansion many makeshifts have been resorted to which should be corrected. During this rush there was no time for a careful consideration of such needs.

With industries looking for methods by which to economize, the opportunity is ripe for a nation-wide campaign to remotorize industrial plants for their own benefit. With production schedules slackened there is opportunity for laying out and installing work with least disturbance to operations.

forum

in the interest of a better motor trade

The Benefits

Results from remotorization are obtainable by all parties involved. Manufacturers of motor equipment and wiring materials, distributors of such equipment, motor specialists and contractors, and power companies are not alone the beneficiaries. The customer gets the prime value from it. His benefits are those smoother and better operating equipment, safer and better designed devices, easier operation for inexperienced employees, increased production capacity, less labor content in the product, and more value for the power dollar.

The possibilities are very far reaching. Modernization can be made to involve revamping of the lighting to present-day standards. It can mean the introduction of accurate and positive automatic control features, even to the use of vacuum tube and photo-electric cell devices. Wiring systems may be simplified and their capacity and flexibility increased.

How May It Be Done?

The broader the scale and the better financed the program, naturally the better the results will be. Yet there is one reature of this movement that is unique. Even without organization, or with only a small organization, there are still possibilities in the idea which offer profit to anyone who takes part in it. An individual dealer, fired with enthusiasm and armed with good reasons and engineering knowledge, can cash in on the idea. It is merely a matter of salesmanship—specialized.

The New York association has set in motion a strong organization. In it salesmen and workers representing all branches of the industry will participate.

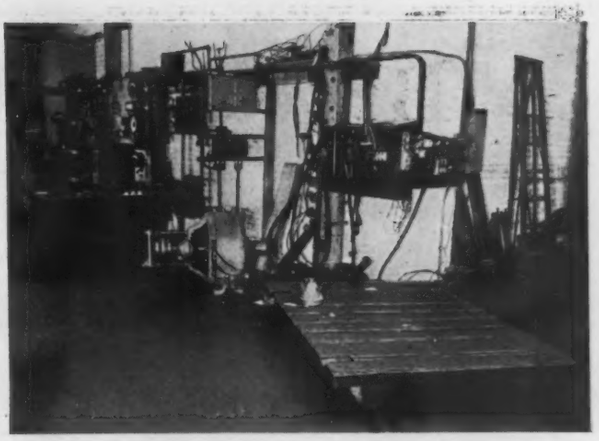
First, representing the association, is the modernization group—consisting of all firms and individuals in the city interested in the movement. This group has selected an executive committee, which governs the working "general modernization committee." The latter is divided into five branches in charge of sales, advertising, finance, speakers, and engineering, respectively. This committee directs the districts, which in their turn have a district general committee, an executive committee, and under the latter the field force of salesmen of the power company, manufacturers, jobbers and contractors.

Some of the salient features of the set-up are as follows: (1) There are a large number of small committees, so as to distribute the load. This interests a large number of men in the project. (2) Simple control is exercised by means of small key committees. (3) The individual sales forces of all companies are enlisted. (4) Each company sells its own product. There is no attempt at allocation of leads or prospects. The advertising and the campaign are stimulative of business for all. (5) Meetings of committees are held at luncheons to conserve time and obtain the maximum attendance.

In New York the program is just getting under way with a strong backing of advertising and business club talks. Hearing of the idea, many other cities have started similar activities. On the Pacific Coast the Los Angeles Motor Section immediately set in motion the machinery of the active and tireless chamber of commerce of that ctiy and plans are under way for similar organization methods there.

Yet, whether there are organization, advertising, public addresses and other movements or not, there still remains an unusual opportunity for the motor specialist as an individual salesman.

This year is the time of all times for modernizing and remotorizing industry.



Test Platform on Rollers

MOTOR tests after a repair job are important functions of the motor shop technique. A particularly flexible set-up has been developed at the Farnsworth Electrical Works, at San Francisco. A platform set on steel rollers running in a 4-in. steel channel for a track is used to mount the motor under test. Thus it can be rolled back until the belt to the generator is taut. A series of parallel steel rails, threated and slotted so that motors or other equipment may be mounted at any desired location on the platform, are fixed to the floor of the platform. Near by is the switchboard and the machine which acts as either motor or generator as required. A heavy jack placed against the end of the platform is used to tighten the belt between the motor and generator.

The switchboard for testing at the rear is particularly well equipped. On this board is a d.c. panel providing 110/220 volts or 500 volts d.c. in conjunction with the shop generator. The a.c. section of the board is directly connected to a transformer vault in the basement immediately below the board. Any voltage from 2½ volts up to 2,200 volts, single, two-phase or three-phase, can be provided from this board up to 150 hp. capacity.

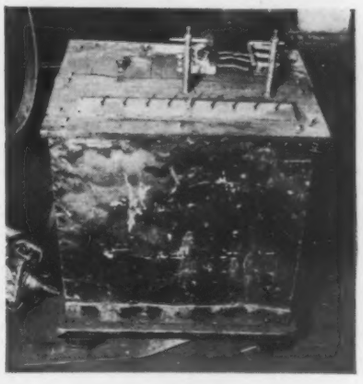
A small table with slate top adjoins the board for the mounting of portable instruments connected to the machines under test.

A home-made magnetically operated oil switch with solenoid to energize the main test transformers prevents the 2,200-volt equipment from becoming alive except when the acting as an a.c. motor or generator, two-phase, or as a d.c. motor or generator.

The plug-in board where the test cables can be plugged in is located on the wall just above the platform.

▼ ▼ ▼

For High Voltage Puncture Tests



SPECIALLY built equipment often requires tests under voltages much higher than ordinary conditions call for. A special puncture test transformer made in the shops of the Farnsworth Electrical Works, San Francisco, for this work is interesting. This transformer is mounted on casters so as to make it portable about the plant. It is equipped with a needle-point air gap and a number of regulating taps by which any voltage desired may be obtained up to 30,000 volts. It is used principally in making puncture tests.

Better Merchandising

THE SALES CONVENTION

Frigidaire Has Developed Its Technique to a Fine Art and Has Features Worth Adopting

SHOWMANSHIP and selling are blood kin. After all, selling is the art of showing something to such advantage that it seems the only desirable thing in the world. Therefore the art of selling becomes primarily the art of showing to advantage.

In this the Frigidaire division of General Motors easily stands in a class by itself. It has perhaps developed the smoothest and most effective technique for the introduction of its new products and the announcement of its yearly selling plans to its sales organization that is known to electrical circles, at least.

From a standpoint of method alone, the recent Frigidaire regional sales convention, held in San Francisco Feb. 21, merits study and not a little imitation. This meeting terminated a series of thirteen such conventions which the same troupe presented to cover the United States. To it came some 1,000 salesmen and their superiors from the Spokane, Seattle, Portland, Salt Lake City, San Francisco, Oakland and Los Angeles divisions.

1. *Primarily* the basic feature is the compact organization of every detail, the concentration into one day, on close schedule, of the complete sales story. This is no small engineering feat in itself, for every detail, even to transportation, meals, and tips, is anticipated.

2. *Next feature* in importance is the trained convention staff. Although announced as employees, which is true enough, the staff is made up of experienced showmen. The acts are written with skill and performed with ease and stage presence. This corporation recognizes that the sales convention is important enough to be handled by experts, and rather than trust to chance to pick up such trained people finds it profitable, evidently, to keep them on its permanent staff.

3. *Likewise* important is the setting. A portable stage, with positive working equipment, good lighting, simple yet colorful draping, and the use of priceless imagination where it will do the most good, are the other ingredients.

4. *Pictorial and dramatic* presentation of every feature. In this year's convention a sparing use of talking pictures was made. This was wise. Any more would have let down enthusiasm. Talkies do not have the colorfulness, the reality nor the human appeal that brightly lighted colored drapes and actual people and objects possess.

5. *Talk was reduced* to a minimum. The speeches were always preliminary to an actual demonstration of the idea as it works out in practice.

6. *Consider* the logical sequence of this program arrangement:

(*a*) Singing and call to order.

(*b*) Invocation.

(*c*) Stunt introducing the troupe getting off the train.

(d) Introduction of the purpose of the convention by R. F. Callaway, vice-president and sales manager.

(*e*) Collection of orders for this year as an inspiration to greater efforts. (The Pacific Coast division, by the way, was announced as standing the highest in dollar volume and in per cent of quota obtained for this year, with $1,300,000 in orders since Jan. 1.)

(*f*) Greeting from factory officials by means of talking pictures.

(*g*) Awarding of cash prizes and distributing of sacks of gold to winners.

(*h*) Introduction of the newest feature, the "hydrator," by an eloquent and capable woman—describing it from the standpoint of its usefulness and value to the woman in the home.

(*i*) Dramatic presentation of new products, among them new commercial models, new commercial compressor units and the newest idea, a "multi-cold" or refrigerator with four different temperatures maintained for different foodstuffs in one box.

(*j*) Luncheon.

(*k*) A playlet utilizing a treadmill stunt which revealed that prospects for sales lurk where least expected "along main street."

(*l*) "Bridging the gap" by means of sales help manuals.

(*m*) Depicting by playlet how advertising helps the prospect to decide which machine to buy.

(*n*) A talk on the relation of the service department work to sales.

(*o*) A playlet showing the dealer that more profit lies in refrigeration sales than in small appliances and accessories.,

(*p*) A talk from the term payment department on its assistance through its contact with term buyers.

(*q*) A burlesque on the effects of high pressure and dishonest selling versus truthful even if not brilliant selling.

(*r*) A presentation by means of imaginative tableaux of the possibilities of water cooler sales.

(*s*) A playlet which treated constructively of the salesman's compensation problem.

(*t*) A summary of the program and its meaning.

(u) A closing pageant of inspirational beauty.

7. *A theme* to which all events in the convention are related—giving them greater meaning.

8. *Stunts* in which the salesmen attending participate dressed in extravagant costumes. This is an aid to having the convention enter into the spirit of the occasion.

Many more of the details of such a convention-show could be described, space permitting. Suffice it to say that many of its features, indeed many of its acts and stunts, will appear in other convention programs this year, even as they did last year, with success.

ZEPS INTO THE KITCHEN

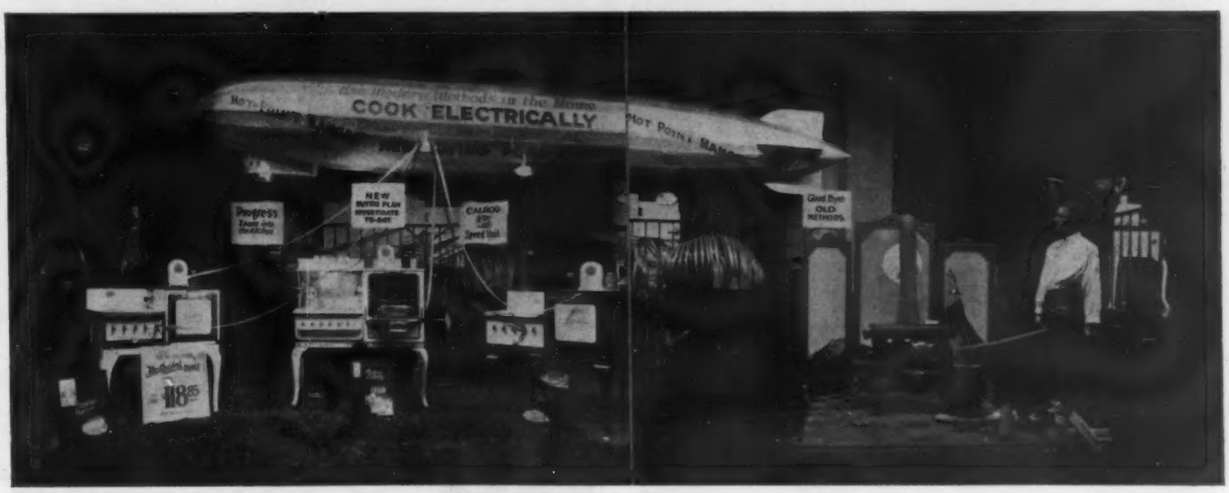
EFFECTIVE and timely capitalization of the successful trip of the *Graf Zeppelin* around the world was made in the fall Hotpoint range campaign of the Northwestern Electric Company, Portland. In the advertising, the window and store displays, and in the salesmen's contest, the Zeppelin was used to typify speed and modern methods exemplified by the new Calrod unit. An 18-ft. model of the Zeppelin carrying a written message of quick and modern electric cooking was the principal feature of a window display that drew far more attention than that aroused by the average range window.

An added feature in this campaign was the nature of the prizes offered to winning salesmen. These salesmen were divided into three groups,—the outside salesmen in the Portland territory, the store salesmen along with those specializing on apartment house sales, and the salesmen in the Washington territory adjacent to Vancouver. Each salesman in all the groups was allotted a quota based on the possibilities in the territory covered by him. The salesman in the first group selling the largest percentage of his quota was offered a trip to the Chicago factory of the Edison General Electric Appliance Company, while in each of the other two groups the winning salesman was offered a trip to Los Angeles and to the Hotpoint factory at Ontario, Calif.

To carry out the Zeppelin idea and to animate the contest, a large map of the United States, on which were charted the air routes from Portland to Los Angeles and Portland to Chicago, was displayed in the company's sales rooms. Every few days, according as the returns were received, colored pins representing the salesmen were moved forward on these routes, the idea being that a Zeppelin air race was in progress.

A series of large advertisements laid stress on the speed of modern electric range cooking

INCREASING
THE TEMPO
OF THE TIMES
DINNER
IN A "JIFFY"
NEW HIGH SPEED has come into the kitchen! The Hi-Speed Calrod heating unit gives to the already fast Hotpoint range even more speed; it accelerates heating fully 29 per cent! Now it is possible to clip minutes off the time of preparing meals for the table and to save, in the course of a year, hours and days of time that may be devoted to leisure. And think of the satisfaction of cooking with electricity—the cool, clean way that preserves the natural flavor of food.
THIS DOES THE TRICK
A newest model Automatic all porcelain enamel range equipped with the Hi-Speed Calrod units can be yours for . . . $118.85
You are invited to see this truly marvelous new range today!
Only $1 down
Ask about our new Buying Plan
NORTHWESTERN
ELECTRIC COMPANY
Light Power Heat
MODERN ELECTRICAL APPLIANCES FOR THE MODERN HOME
Public Service Bldg., Sixth and Taylor—BRoadway 7611



Contrasting the old wood stove days with the electric range of the day of the Zeppelin

An attractive and interest-arousing booklet has been circulated

An All-Electric Home On a Single

BATHROOMS come complete. The idea of selling a man a bathtub, and later a wash basin, and following that some time later with a medicine cabinet if he hadn't spent all his money on a new radio—would be ridiculous.

Likewise with furniture. Unless a young couple inherits or has given to them a lot of miscellaneous furniture, they buy furnishings for their new home complete, even to the drapes and the hanging of the curtain rods.

Why not the electrical home equipment all in one purchase then? Why has the piecemeal system of appliance selling persisted—a vacuum cleaner first, perhaps, then maybe a washer, an ironer and eventually something else, if the money hasn't gone for a new car? Upon this theory the British Columbia Electric Railway Company, Ltd., Vancouver, B. C., has struck at the crux of the problem of electrifying the home with its "electric home contract" plan. The idea of group appliance selling, perhaps, is not entirely original. But the plan of making possible the purchase of *all* appliances for the home *under one long-term contract with a very low down payment* has not been used extensively, if at all.

The plan adopted by this company was put into effect June 18, 1929. Six crews of outside salesmen are operated in the Vancouver territory. Each crew specializes in one or two appliances, such as ranges, air heaters and water heaters; washers and ironers; vacuum cleaners and health motors, etc. Thus if one of the salesmen calls on a lighting customer, he has an opportunity to talk complete electrification of the home instead of confining himself to his one specialty. He tries to interest the customer in buying a group of appliances rather than selling him first, say, a washing machine and then a range, and so on.

By spreading the payments over three years it is possible for a customer to buy four or five appliances for about the same monthly payment as the regular terms on a washing machine, range or other major appliance. The plan meets the real competitors of the electrical merchant, the radio dealer, the automobile salesman, the furniture man and others who also are after the precious consumer's dollar.

Appliances have been arranged in two groups. Class A appliances include: electric range, refrigerator, air heater (3 kw.), electric ironer and clothes drier. Class B appliances include: washing machine, dish washer, floor polisher, water heater, vacuum cleaner, table appliances, kitchen heater, lighting fixtures and electric clock. The customer makes his selection, choosing at least two Class A appliances. Inclusion of these two appliances, providing the total amount of the contract is $500 or more, entitles the purchaser to the very liberal terms of the electric home contract plan.

A down payment of 5 per cent is required and the balance is payable in 36 monthly installments with interest at 8 per cent on the balance outstanding at the end of each month.

For the convenience of salesmen in figuring the monthly payments a simple factor has been worked out. By multiplying the amount of the contract, after down payment has been deducted, by the factor of 3.126, the amount of the 36 monthly payments is ascertained. Some typical contracts are given below:

Method of Payment		Total Cost Over Three Years
$500 Contract—		
Down payment	$25.00	
36 monthly payments of	14.90	$ 561.40
$750 Contract—		
Down payment	37.50	
36 monthly payments of	22.30	840.30
$1,000 Contract—		
Down payment	50.00	
36 monthly payments of	39.70	1,119.20
$1,500 Contract—		
Down payment	75.00	
36 monthly payments of	44.60	1,680.60

The new store of the B.C. Electric Railway opened just before Christmas at North Vancouver, a growing suburban residential district across the inlet from Vancouver

CONTRACT

Vancouver Company Pioneers a New Idea in Group Selling of Appliances

"You can be enjoying the use of all these necessary home appliances under this contract, madam"

The usual amount of range and water heater wiring may be included in the group appliance contract, but where extra wiring is required the contract is approved by the company before it is signed by the customer as it may be necessary to increase the down payment. The regular lien agreement form is used. Appliances sold on group contracts are sold at regular list prices and carry the full amount of profit.

In practice it has been found hard to get the rank and file of the specialty salesmen to interest themselves in the plan. Some of the older and more experienced salesmen, however, have written up some very good business on this plan, and aside from the actual group contracts obtained they have, in dozens of cases, worked the customer up from one appliance to two or three, which have been sold on the regular terms. The rest of the salesmen are beginning to see that there are great possibilities in pushing the plan. The number of group contracts taken up to the latter part of December was fifteen, amounting to $13,840, or an average of $920 each. Six of the contracts were cash.

Outside of mailing the group contract pamphlet to builders of new homes, practically no advertising was done during 1929. It was planned to include an appropriation in the 1930 advertising budget and more actively push the plan.

The sales department of the company is enthusiastic over the plan and is convinced that it is proceeding along proper lines in electrifying the home as a unit instead of attempting to do it piecemeal by individual appliance sales.

Edmund E. Walker, sales engineer, says of it:

. . . . "By spreading the payments over a three-year period, we make it possible for a customer to buy four or five appliances for about the same monthly payment as the regular terms on, say, a washing machine or a range, and we thought also that this plan would meet our real competitors, who are the piano salesman, the car salesman, the furniture man and others who are striving for the consumer's dollar. . . . . I am convinced that we are proceeding along the right lines in endeavoring to sell a man an electric home instead of the odd appliance."

PORTLAND FOLLOWS SUIT

That the idea has followers, some in slightly different form, is evidenced by the announcement of the Portland Electric Power Company that a new plan of credit extension designed to permit a

Cashier

ACCT. DEPT COPY **PORTLAND ELECTRIC POWER COMPANY**
MERCHANDISE SALES AGREEMENT

No. _____

Date _____ 193__

The undersigned purchaser offers to purchase the following from the PORTLAND ELECTRIC POWER COMPANY:

and agrees to pay for the same as follows:

Purchase Price	$	To be paid in Monthly installments of	$
Bal. Unpaid on	$	Plus a monthly carrying charge of	$
Total	$	Total Monthly Payment	$
Down Payment	$	First payment to be made on the first of	
Balance Owing	$	and subsequent payments on the first of each month thereafter.	

THE FOREGOING AND THE TERMS PRINTED ON THE BACK HEREOF SHALL CONSTITUTE THE WHOLE CONTRACT

NO CONDITIONS OR PROMISES ARE BINDING UNLESS SET FORTH IN WRITING HEREIN.

Not binding upon Company until accepted in writing by _____ Purchaser _____

Credit Manager _____ Home Address _____ Phone _____

Order Taken by _____ Business Address _____ Phone _____

Received on Initial Payment $_____

The Purchaser and the Portland Electric Power Company hereby agree to the following:

1. A carrying charge shall be paid by the purchaser amounting to ½ of 1% per month on the balance owing at the time of the execution of this contract. Should the purchaser pay the balance owing on this contract before the same is due, the purchaser will be allowed as a discount that portion of the said carrying charge which is unearned at the time of such payment.

2. All payments that are not made when due shall bear interest at the rate of 8% per annum after maturity

3. The title to the within described property shall remain in the Portland Electric Power Company until all payments hereunder have been made, but risk of loss shall be on the purchaser

4. Should the purchaser fail to pay any installment when due, or cease to use the said Company's electric service, all sums then unpaid on the balance owing on this contract shall, at the option of said Company, immediately become due and payable. On default of payment herein, or removal or attempted removal of said property from the premises to which the Company may deliver said property, the said Company may, at its option, claim and retake possession of the property wherever the same may be found, and all payments previously made shall be retained by said Company as rental for the use of said property and to defray expense in delivering, installing and removing said property, or the Company may, at its option, require payment by the purchaser of whatever balance may be owing on said contract at the time of said default.

5. Time of payment is hereby made of the essence of this agreement, but the waiver by the Portland Electric Power Company of any default by the purchaser shall not be construed as a waiver of any subsequent default.

Form and conditions of the contract just put into effect by the Portland Electric Power Company. It contains some unique features

good credit customer to purchase more than one appliance without unduly increasing his monthly installment burden, has been put into effect. Briefly the plan permits the addition of the selling price of the second appliance to the unpaid balance of the first appliance, establishing a new total balance to be liquidated in a maximum of eighteen months from the time of purchase of the second appliance.

In practical operation the plan is applied in this manner: Suppose a customer owing a balance of $60 on an electric range with several months' payments yet to run, desires to purchase a washing machine for $120. The sum of these amounts, $180, is entered on a new contract; the amount already paid on the range is considered the down payment on both appliances; the total amount of $180 is divided by eighteen, producing a monthly installment due of $10; the standard carrying charge of one-half of one per cent a month on the new purchase, 60 cents, is added, bringing the total monthly payment to $10.60; and the two appliances are covered in a new merchandise sales agreement superseding the one given at the time the range was originally purchased.

An important feature of the plan is that the sales contract shows the monthly installment and the monthly carrying charge in separate items, it being desired by the company that a clear understanding of the carrying charge be had at the time of the purchase rather than having the carrying charge buried in a gross amount which might give rise later to argument and contention.

A new form of merchandise sales agreement has been developed by the accounting and legal departments which carries all the pertinent information about the sale, including prices and carrying charges on the face of the form, while all the legal clauses pertaining to payments, defaults, and the rights of purchaser and seller are printed on the reverse side of the form.

▼

What Height Racks for Oven Cooking?

Everything which makes for successful cooking on an electric range helps sell the range idea. The Pacific Power & Light Company, Portland, recently distributed the following advice on cake baking to electric range users:

Helpful Hints in the Use of Your Electric Range—Approximate Placement of Racks for Various Kinds of Baking

1. Cakes—	
(a) layer	6th or 7th
(b) loaf	7th or 8th
(c) sponge and angel	7th
(d) cup cakes and muffins	6th or 7th
2. Cream puffs	9th
3. Pies—	
(a) fruit	4th or 5th
(b) shells	5th or 6th
4. Biscuits	5th or 6th
5. Bread	5th or 6th
6. Roasting	4th or 5th
7. Canning	4th

COAXING TESTIMONIALS

OF ALL advertising devices there is perhaps none so firmly established as the testimonial. Its value is generally recognized, and probably it would be far more used in the electrical retailing field if practical ways of obtaining testimonials as needed were known. The Home Gas & Electric Company, of Greeley, Colo., hit upon a plan for securing testimonials the results of which were nothing short of amazing. The plan in this instance was applied to electric ranges, but it could be adapted with equal success to any electrical appliance.

For use in an electric range campaign this company desired testimonials. John E. Camfield, commercial manager, prepared a letter which was sent to 360 electric range owners, all of whom had bought their ranges from the company. The letter asked directly for an expression of opinion, and for the range owner's trouble in replying offered to send two motion picture theater tickets. This was the letter:

> We are going to take the privilege of asking you to do us a favor, if you will.
>
> For a good many years we have been conscientiously selling electric ranges because we know that it is the clean, healthful and modern way of cooking.
>
> You purchased one of our ranges, and we were wondering if you would be so kind as to sit down and write us a letter telling us what you think of electric cooking, etc.?
>
> If you will do this we surely will apprecite it, and as soon as we receive your letter we will send you two tickets to the Sterling Theater for your trouble. These tickets will be good any time and we hope you will use them and enjoy the show.
>
> If you do not care to have us mention your name in talking to prospects or in our advertising please tell us in your letter, and we assure you your wishes will be respected.

There was a special arrangement with the theater covering the tickets.

Mr. Camfield, in sending out these 360 letters felt that 25 or 30 testimonials would be ample response.

Instead, approximately 200 of the recipients wrote testimonial letters! Some of the letters were very long, and must have required at least an hour to write.

And the letters were exceptionally good. Here is a sample, later used in advertising:

> *I am an ardent enthusiast of the ELECTRIC RANGE.*
>
> *I have been using one for SIX YEARS and it is certainly the CLEANEST and most ECONOMICAL way of cooking. It saves TIME and WORRY as well as MONEY and while it is possible for me to use an ELECTRIC RANGE I shall HAVE NOTHING ELSE.*
>
> *You can refer anyone to me any time you care to.*
>
> (*Signed*) MRS. RUTH U. COOPER.
> *1715 Eleventh Ave.,*
> *Greeley, Colo.*

Each testimonial was acknowledged in a letter accompanied by an order upon a local theater for tickets.

Undoubtedly, testimonials covering any electrical appliance can be obtained in a manner similar to this. The great bulk of buyers and users are well satisfied. If there is some incentive, they will express their satisfaction. Compared with general claims of superexcellence, the testimony of local people is far more convincing to many prospective buyers. Once testimonials have been obtained, they can be used in newspaper or other printed advertising, given to salesmen, who use them in working on leads, or turned to sales account in other ways.

▼

Rotate Salesmen in Charge of Class

J. H. Warden, sales manager, El Paso Electric Company, El Paso, Texas, is getting good results from weekly sales meetings which are held each Monday evening and attended by the entire personnel of his department. At each of these meetings a member of the department is assigned the task of analyzing some particular electric applance, especially as to its importance as a load builder. This analysis consumes the major portion of the meeting, which lasts from an hour and a half to two hours, and is followed by a round table discussion.

Salesmen rotate in handling the principal discussions, the preparation of which necessitates considerable research. Besides this, the entire personnel of the department is greatly benefited through the round table discussions which follow each anaysis. Interest in the meetings was so keen during the whole of last year that they were continued throughout the summer months.

This sales school has generated considerable enthusiasm through the increased knowledge obtained, which has increased the volume of merchandise sales on appliances approximately 30 per cent. The meetings have developed many new sales arguments and enabled salesmen to be of greater assistance to customers in intelligently bringing out all of the service angles of the various appliances sold.

WHETS LOCAL INTEREST

Strongest Tie That the Local Merchant Has Is That Which He Can Build Up by Developing Local Pride

WHEN the electrical dealer in the small city or town starts to advertise, what is it that he must sell? Must he imitate the big city merchant or must his advertising be something different? This is a problem each must face.

ELECTRICAL NEWS GAZETTE

Tucson, Arizona — April 28, 1929

Published Now and Then by Russell Electric & Machine Co.

As Summer Approaches— Think About Electric Cooking

Electric cookery is clean. You can see your face reflected in your pots and pans when they are used on an electric range because it delivers pure heat direct to the utensil. With electric cookery there is no combustion to consume oxygen and give off soot—no waste heat to raise the temperature of the room—no oven fumes with their greasy deposit. Not alone the pots and pans but the whole kitchen, walls, ceilings and draperies, remain spotless.

How a Clothing Store Uses Frigidaire

Myers & Bloom Co.

the most modern clothing store in Arizona selects the most modern and up to date wiring for their new store . . . also insure clerks and customers fresh, cool water every day by installing a FRIGIDAIRE water cooler.

Electric Fan Time!

They're here in all sizes and kinds and in many makes. Come in for an early choice — be ready for the first hot days.

Oscillating Fans

Stationary Fans (Polar Cub)	8-Inch
$4.50 up	$9.95 up

Buy one in color this year if you like

Continuous improvement to bring to the home every possible refinement in automatic refrigeration is the goal of Frigidaire Corporation. This policy is strikingly reflected in the New Distinctive Tu-Tone Frigidaire. Even greater beauty, convenience and incredibly quiet operation have been achieved in these new models. From the sturdy framework of the cabinet to its attractive finish in lustrous porcelain enamel of Glacier-Gray and White, with satin-finish fittings, the New Tu-Tone Frigidaire represents the ultimate in beauty and performance.

Hang a Lantern Aloft— Said Paul Revere

to sound the alarm that the British are near . . . here in our fixture department you will find ELECTRIC lanterns exact copies of many such lanterns as were carried to the doors on the night Paul Revere made his famous ride through Middlesex Village and Fárm

Just How Big Is Our Wiring Service

So big that we are doing the wiring jobs at both the new Consolidated National Bank Building and the new Steinfeld Hotel. Truly, "no job too large, no job too small."

This Week's Special EXCEL COOKERS $8.35

High and Low Heats

HIGH heat for quick cooking and LOW heat for keeping food hot for hours, all day or all night if desired. A wonderful convenience for those who are away all day and wish to come home to a hot meal.

Don't Stay Home to Cook

Merely place the roast potatoes, vegetables, and pudding in the cooker—turn on the current according to the cooking chart. By the time you are dressed for the street it will be about time to turn the current off—you are free for hours, while the EXCEL continues to cook by stored heat.

Don't tolerate cooking odors....

WEST WIND *whisks them away*

WEST WIND Ventilating Fan

Tucson's Electrical Department Store

RUSSELL ELECTRIC & MACHINE CO.

PHONE 18 — 221-223 E CONGRESS

No Job Too Large — No Job Too Small

The Power That Makes The Wheels Go 'Round

More and more that power is electricity. In shop, in office, in transportation and now in the homes of the land. The marts of trade, flourishing farms, happy households, all reach the peak of efficiency when properly supplied with electrical appliances. Among the most sensational from the standpoint of growing demand is Electrical Refrigeration for the Home. The outstanding one of these is FRIGIDAIRE.

Carload of Frigidaires Unloaded Friday

Tucson, in keeping with its marvelous growth in both residential and business districts, is now "Frigidairically speaking," a carload-town. This week, Friday, we unloaded another CARLOAD OF FRIGIDAIRES. And listen — out of that carload, half of them were delivered direct to homes in Tucson.

FRIGIDAIRE for Baby's Health and Yours

Baby's health is your greatest concern. It is always uppermost in your mind. To insure good health, children need the nourishment which only pure, wholesome foods can provide.

And, because food plays such an important part in good health, you are very careful to select those foods which you know to be CORRECT.

But those foods must be PROPERLY PRESERVED to insure healthfulness. FRIGIDAIRE will preserve those foods which constitute baby's diet through dry, uniformly cold temperatures below 50 degrees. It's up to you as an absolute health precaution.

Locals

A new Frigidaire recently found its way into the home of Mrs. L. G. Murray, 307 East Pennington St.

Mrs. J. A. Holt, of R. R. 1, city, recently purchased a late model Frigidaire for her home.

The H. M. Morris folks at Lester and Maple avenues assure themselves fresh foods from now on by their recent purchase of a late model Frigidaire.

Folks who stop at Olivet Drashman's root beer stand this summer—and there are always lots of them—will take soothing drinks out of their special new Frigidaire.

The M. M. Watts home at 106 north Tyndall avenue now boasts a fine new Frigidaire.

The Oracle people just will have things right up to the minute—we hear comes Myra Phelps Coe of that place with an order for the latest model Frigidaire.

H. M. Hubbard is assured perfect preservation of foods the year round through his recent purchase of Frigidaire for their home at 2101 East Sweetwater.

Another happy home among the list of Frigidaire owners is that of J. B. Carothers of 618 South Fifth avenue.

F. M. Stevenson home, 3400 North Stone avenue, will no longer worry about the ice problem, having recently purchased a fine new Frigidaire.

But at the P. Alajada ranch home, south of the city, folks will have the ice problem solved through the purchase of a new Frigidaire.

The J. S. Smith home, at 815 East Tenth street, is the scene of a recent new Frigidaire installation.

FRIGIDAIRE Leads in Beauty and Performance

Continuous improvement to bring to the home every possible refinement in automatic refrigeration is the goal of Frigidaire Corporation. This policy is strikingly reflected in the New Distinctive Tu-Tone Frigidaire. Even greater beauty, convenience and incredibly quiet operation have been achieved in these new models.

From the sturdy framework of the cabinet to its attractive finish in lustrous porcelain enamel of Glacier-Gray and White, with satin-finish fittings, the New Tu-Tone Frigidaire represents the ultimate in beauty and performance.

Sweet Kitchens by WEST WIND

HOW about the comfort of your home? Are you, like many home owners, annoyed by smells, stale air and odors that come from the kitchen and creep through all the house?

West Wind, an inexpensive, good-looking, quiet ventilating fan, set in an outside wall of your kitchen, literally pulls out every trace of odorous, heavy air as it rises from the stove and turns it out of doors. It keeps the air of your entire home fresh, sweet and breathable. Call at — let us show you the West Wind Ventilating Fan.

WEST WIND Ventilating Fan

7-Year-Old Tucson Frigidaires

There are a few of them in Tucson. Long life is one qualification for success in electrical refrigerators. Three Frigidaires in Tucson that have seen service for 7 years now are those at the homes of Lyndon Wilson, Gen L. H. Manning and Harold Bell Wright.

RUSSELL ELECTRIC & MACHINE CO.

PHONE 18 — 221-223 E CONGRESS

The Russell Electric and Machine Company, of Tucson, Ariz., decided that its advertising should be different. It decided that it should be particularly local. It even decided that it would compete with the news columns in giving local news—relating to the electrical equipment it sells, of course, but news none the less.

Accordingly, nearly always the advertising of this dealer assumes the form of a newspaper within the newspaper in which it appears, "published now and then." In this newspaper it tells the virtues of the electrical equipment it sells, but also it tells who it has sold a refrigerator to, what they think of it, or sometimes just a little boost of its own for one of its customers.

All of this is very much personalized. It is the country paper local news item still more personalized. But it brings results. It has a large circle of readers—and buyers, and after all that is what counts.

News of the Industry

Pacific Power & Light Co. Three-Day Meeting Reveals $1,250,000 as 1930 Sales Quota

AT ONE of the most pretentious meetings of its kind ever attempted in the Northwest, department heads, district managers, and salesmen of the Pacific Power & Light Company, Portland, gathered for a three-day meeting in that city Jan. 23-25 to hear outlined and to discuss in detail the plans by which the company expects to sell $1,250,000 worth of electrical merchandise in 1930 and add $180,680 annual revenue thereby. The meeting, which was attended by 75 company employees and 55 manufacturers' representatives, jobbers, commercial men from other utility companies, and other interested persons, was featured by an elaborate exhibit of the principal items of merchandise to be sold during the year.

Among the speakers from outside the ranks of the company to address the meeting were E. N. Hurley, Jr., president, Electric Household Utilities Corporation, Chicago; Ray W. Turnbull, Pacific Coast sales manager, Edison Electric Appliance Company, San Francisco; M. L. Hibbard, vice-president and general manager, Idaho Power Company, Boise; and H. D. Laidley, president, The Laidley Company, Portland, new distributor of General Electric refrigerators in Portland and Spokane. The first two evenings of the three-day meeting were enlivened by banquets tendered to the entire group, the first night by the General Electric Supply Corporation, and the second by The Laidley Company.

Major items in the program as outlined by V. H. Moon, merchandise manager of the utility, included 2,000 ranges, 1,500 water heaters, 1,100 refrigerators, 2,000 washers, 1,000 ironers, 1,000 radios and 800 vacuum cleaners, which would account for 92 per cent of the sales quota. Major campaign efforts on all these items are scheduled while minor campaigns are to be conducted on ten lesser items.

The 1930 program represents an increase of 16½ per cent over the volume sold in 1929 and will amount approximately to $28 per residential customer.

Executive support of the 1930 program was brought to the meeting by Guy W. Talbot, president, and Lewis A. McArthur, vice-president and general manager of the company, who stressed the desirability of selling load-building merchandise.

Mr. Hibbard told of the merchandising accomplishments of the Idaho Power Company in 1929 in which $1,076,000 of merchandise was sold amounting to $37.27 per customer. In this campaign 3,327 ranges were sold, raising the company's range saturation from 36 per cent to 42 per cent, which, with 2,204 water heaters and a variety of other merchandise added in 1929, increased the kw.-hr. consumption per residential customer from 1,162 in 1928 to 1,258 in 1929.

A message from D. E. Harris, vice-president, General Electric Supply Corporation, San Francisco, was read in his absence by George Boring, manager of the Portland office of that company, in which the importance to the utility of the proper kind of job set-up was brought out. H. M. Hucke, Portland representative of the Radio Corporation of America, discussed certain trends in the radio business that might be looked for during the coming year, and the large field for increasing lighting revenues was described by J. F. Reinke, Portland, Northwest manager, Edison Lamp Works.

V. H. Moon, merchandise manager, uses a chart to show the number of appliances that must be sold in order for the Pacific Power & Light Company to meet its quota of $1,250,000 for 1930. This quota sets as a goal the sale of $28 worth of appliances to each domestic customer

E. N. Hurley, Jr., (left), president, Electric Household Utilities Corporation, Chicago, congratulates L. A. McArthur (right), vice-president and general manager, Pacific Power & Light Company, on his company's sale of Thor home laundry products in 1929, and expresses confidence in the company's 1930 program

Most optimistic was the story brought by E. N. Hurley, Jr., Chicago, relative to the plans of his company for doubling its 1929 business with the sale in 1930 of $25,000,000 of Thor products.

Plans for the distribution of 7,500 refrigerators in the territory allotted to The Laidley Company were outlined by Mr. Laidley.

A dynamic address on "Selling Values" by Mr. Turnbull brought the second day's session to a brilliant close with a fine exposition of the elements entering into successful salesmanship.

The Saturday morning session was devoted to an intensive discussion by company men only of some of the spring campaigns to be undertaken by the company.

Reorganization of Seattle City Light Department Recommended in Experts' Report

AMONG the recommendations in a report recently submitted to the City Council by Lybrand, Ross Brothers & Montgomery, the City of Seattle's efficiency experts, on the municipal light department, is the complete reorganization of the City Light Department under either a superintendent or a non-salaried utility commission. Division or departmental administration is proposed along three lines, with an executive superintendent at the head as follows: (1) Commercial and financial division; (2) Operating division; (3) Engineering division.

One of the three division heads is suggested to be an official authorized to act for the superintendent in his absence. Control over light department engineering is given by the charter to the city engineer, and this arrangement should be changed, the experts recommend. If it is not, they propose that the department engineer take over responsibility for planning and supervision over technical features of ordinary maintenance and service extension and such experimental work as may be recommended.

The report was read before the council as a whole, and J. D. Ross, superintendent of the department, presented a report at the same time, in which he charged that interference from the City Council and the city engineering department had been responsible for many costly mistakes and delays connected with City Light affairs for which he, personally, had been blamed.

The experts' report declared that Light Department accounts are in poor condition with no effective supervision, and especially condemned the manner in which customer accounts are handled. It stated that the attention of the Light Department heads had been called to these matters, and that some reforms have been instituted. Sixty-day billing has been abandoned in favor of monthly billing, but the report declares that a complete reorganization of the customer service is necessary. Introduction of modern bookkeeping machinery, as an example, say the experts, would allow 23 employees to perform the service now done by 54 and save between $40,000 and $50,000 annually, besides improving the effect on customer policies and service.

Examples of the manner in which customer accounts are kept were given as follows:

> Tests of 8,676 residence lighting accounts out of a total of 75,192 showed that 44.27 per cent of the total amount outstanding on these accounts represented balances which in ordinary commercial practice would be considered past due or delinquent. Further analyses indicated that 22.95 per cent of all residence accounts tested carried balances past due for two to six months and, in a few cases, for even longer periods.
>
> A review of one-half of the power accounts (1,199 out of a total of 2,398) revealed the fact that 31.99 per cent of the aggregate balances outstanding represented billings which in ordinary commercial practice would be considered past due or delinquent. Several of these accounts showed bills unpaid for six months or more.
>
> In the business lighting accounts we found 49.20 per cent of the aggregate business outstanding represented billings which in ordinary commercial practice would be considered due for periods of from two to six months and more.
>
> Accounts with customers purchasing ranges and other electrical appliances showed that a large proportion of the installments were delinquent and that no uniform or effective procedure had been developed to insure prompt payment of installments when due.

Commenting on the departmental organization the experts said:

> The department head is burdened with too many details and the direct supervision of too many separate activities.
>
> There is not a proper division of authority and responsibility for major functions under competent assistants nor is there an effective use of such staff organization as exists at present.
>
> Commercial and financial functions are not adequately supervised or correlated.
>
> Authority and responsibility for the operating units are too much decentralized.
>
> The combining of construction and operating functions under the same supervisory assistants has, in our opinion, resulted in a lack of proper distinction between two phases of the department's activities and has resulted in the uneconomical methods and excessive personnel.

The experts touched lightly upon competition in the electric power field and the possibility of combining both publicly and privately owned local plants. If such a step should be taken, it was urged, "millions of dollars would be saved by early plans looking toward that end."

If there is no consolidation of local power plants, the experts proposed a conference between responsible heads of the city and the private power plant, and suggested for discussion in conference such subjects as alleged "cutting in" on each others' customers, uniformity of practice regarding contracts, alleged rebating and special inducements to secure business, equitable adjustment of expenses for moving poles in joint use, unnecessary duplication of underground and overhead service, and the adoption of sound merchandising, credit and collection policies.

The city experts recommended the adoption of a long term construction program, somewhat similar to that recommended by the Municipal League several months ago, but emphasized the necessity for obtaining technical rather than political advice. In discussing the problem, the report says:

> It would at least be practicable to prepare plan and system ordinances covering larger phases of development than have heretofore been the practice, providing that bonds be issued as required up to a certain total sum and leaving wider latitude in technical details to those officially responsible for such matters.
>
> The technical specifications included in a long-term plan should be prepared by the department, assisted, if necessary, by competent, duly authorized technical advisers. It is desirable that the means of adopting the plan shall insure that the specifications are not inadvisedly changed by non-technical legislators and administrators.

In his report, J. D. Ross, superintendent of lighting, gave his assurance that he would study the recommendations from the experts in a constructive spirit. He declared that the Light Department has served the public for about 25 years, that it has 95,000 customers and Seattle's street lighting, and is a $43,000,000 concern, and that the demand on it for power and service is so great that it must double every five years.

During the last 20 years, his report stated, there has been a bitter competitive struggle. He admitted there have been losses, mistakes in judgment, losses on account of weather conditions, accidents and emergencies, and a number of other reasons, but the records will show, he declared, that the amounts so lost are insignificant compared with the money lost in ways beyond the control of the superintendent of lighting and his organization. He urged that his department be given full charge of engineering connected with the City Light construction, stating that work of this character handled in the past by the city engineering department has been slow and unsatisfactory, and declared his belief that the public would be glad to vote an amendment to the city charter which would give the Light Department control over its own engineering.

▼

Unit No. 11 in Operation at Long Beach Station

As this issue of ELECTRICAL WEST goes to press, Unit No. 11 of the Southern California Edison Company's Long Beach steam station, after meeting all expectations in governor and over-speed trip tests conducted during the past month, has been placed in service on the company's lines (Feb. 23), picking up a load of 20,000 kw. in 15 min. This was increased after five hours' operation to 40,000 kw., with operation continuing at this value for an additional five hours. It is expected that the unit will be placed on the line for continuous service on or before March 1.

Unit No. 11 is a duplicate in all its major features of Unit No. 10 of the same plant, the only noteworthy change in design being in the steam superheaters, which for the new unit are of single-pass design instead of three-pass as for Unit No. 10. The new boilers were thoroughly broken in in advance of operation by bypassing the steam to Unit No. 10. The over-all plant efficiency for Unit No. 10 for the year 1929 was 12,848 B.t.u. per net kw.-hr., and the improved superheater design for Unit No. 11 is expected to result in a still higher over-all plant efficiency for this unit.

The addition of the new unit increases the capacity of the Long Beach steam station to 415,000 kw. and the steam generating capacity of the Edison company to 461,000 kw.

Propaganda Phase of Federal Trade Probe Ended

Washington Correspondence

With the close of its session in Washington on Jan. 18 the propaganda phase of the Federal Trade Commission's investigation virtually ended.

The answers prepared by counsel for the utilities after two years of quizzing ran through only seven hearing days. In review, it will be noted that the testimony did not take the form of a defense, but was an explanation of motives. No attempt was made to explain in detail the activities of publicity bureaus and power companies who have worked directly or indirectly to uphold private enterprise as a sound policy for the maintenance of our national industries. The inference is that the industry considers its activities in this line as proper and necessary, barring a few mistakes by individuals which have been played up by public ownership groups to show the utilities in the worst possible light.

The second major division of the inquiry, the financial phase, was begun on Feb. 24 after several weeks of delay made necessary by the large volume of figures and compilations which are required. The long series of hearings which will follow will relate to the growth of capital assets and liabilities of the power companies and other features called for in Senate Resolution No. 83 under which the investigation is operating. Possibly the financial elements will be interspersed by some questioning on publicity as witnesses able to yield additional data are called to the stand.

A further summary of the whole case presumably will be offered after the financial phase of the investigation is completed.

▼

Annual Commercial Meeting Held by Idaho Power Co.

The complete co-ordination of all departments of the company and co-operation with contractor-dealers, manufacturers, and jobbers toward accomplishing the goal set by the Idaho Power Company for increased business in 1930, were the keynotes of the company's fifth annual commercial meeting, Feb. 6-7, 1930, at Boise. The meeting was attended by department heads, division managers, local managers, division sales managers and salesmen. Talks by representatives of practically every department in the company showing how the work of all the departments could be co-ordinated, were heard. At the banquet on Feb. 7 Lewis A. Lewis, assistant general manager, The Washington Water Power Company, Spokane, spoke on the effect of merchandising on revenue and public relations.

After welcome from the mayor of Boise and an outline of the objectives of the company by M. L. Hibbard, vice-president and general manager, L. W. Brainard, sales manager, explained the company's commercial program for 1930. The company will concentrate on three main activities to produce a prospective increase of 9,500,000 kw.-hr. in 1930; these activities being the adding of new customers with special attention to those on existing lines not now served, the sale of ranges and water heating installations, and rural service. Other activities to which considerable attention will be given are commercial and advertising lighting and commercial cooking.

In the merchandising quota for 1930 in which $1,100,000 of gross sales is contemplated are 3,500 ranges, 2,350 water heaters, 1,200 refrigerators, 1,200 washers, 300 ironers and 1,000 farm motors. In the rural electrification program each district is assigned a quota of miles of new lines and new customers totaling for the entire system 200 miles of line and 900 customers.

▼

2,500-Hp. Boiler to Be Added to Valmont Steam Plant

A half-million-dollar addition to Valmont, the Public Service Company of Colorado's steam generating plant near Boulder, Colo., is in immediate prospect, according to announcement by Clare N. Stannard, vice-president and general manager.

The enlargement will consist of a 2,500-hp. boiler designed to produce 275,000 lb. of steam at its highest rating and will increase the peak load capacity of the station, said to be the largest powdered-fuel plant between the Missouri River and the Pacific Coast, to 45,000 kw.

▼

Edgar Miller Dies Suddenly

EDGAR GAIL MILLER, treasurer of the Southern California Edison Company, and son of John B. Miller, chairman of the board of that organization, died at his home in Pasadena, Calif., on Feb. 28, 1930, at the age of 30. Death came from heart failure. Serving in the Marine Corps during the World War, Mr. Miller joined the Edison company in 1919. He became assistant secretary in 1922, acting treasurer in February, 1925, and treasurer in June, 1925. In addition to his position with the Edison company, he was a director of several southern California corporations.

Great Western Power Co. Rates Reduced March 1

Interim rates for electric service on the system of Great Western Power Company of California, including Napa Valley Electric Company, have been established by the Railroad Commission to be effective on meter readings taken on and after March 1, 1930. The rates of this company are fixed upon a comparable basis with those recently established for the Pacific Gas and Electric Company. The new rates are expected to result in a reduction of the gross revenue of the company of $516,400, or 5.33 per cent, estimated on the 1929 basis, or $568,000 per year, estimated on the basis of 1930 consumption.

As shown by the following table the rate reductions range from 2.72 per cent to 7.95 per cent, the average reduction per schedule being 5.33 per cent:

	Reduction	Reduction Per Cent
Lighting		
Domestic	$ 77,600	7.95
Commercial	218,600	7.95
Municipal	1,100	4.59
Miscellaneous	7,000	7.95
Power		
Heating, cooking	18,000	3.51
Commercial	52,700	4.59
Industrial	107,800	3.47
Agricultural	11,500	2.72
Municipal	8,200	4.59
Miscellaneous	13,900	4.59
Total 1929 basis	$516,400	5.33
Total 1930	$568,000	

General domestic and commercial lighting rates in San Francisco and the East Bay territory and in incorporated cities outside of these territories have been reduced from 5, 4, 3, 2.5, and 2.5 cents on 200, 800, 2,000, 12,000, 15,000 kw.-hr. per month, and over, to 4.5, 3.7, 2.9, 2.4, and 2 cents, respectively. In all rural territory the rates have been reduced from 6, 5, 4, 3.5, and 3.5 cents to 5.5, 4.7, 3.9, 3.4, and 3 cents, respectively.

▼

Snows in Colorado Relieve Fear of Water Shortage

All January snow records were broken in Grand Junction, Colo., when 20.9 in. fell during the first month of the year, exceeding the former mark by 5 in.

Precipitation was much needed and averts the threat that western Colorado would suffer for lack of water for hydro-electric and irrigation purposes in 1930.

▼

FIRST HYDROGEN-COOLED SYNCHRONOUS CONDENSER IN THE WEST—The Southern California Edison Company, Los Angeles, has placed an order with the Westinghouse Electric & Manufacturing Company for the first hydrogen-cooled synchronous condenser to be used west of the Mississippi River. This condenser, rated at 15,000 kva., three-phase, 11,500 volts, 50 cycles, at 750 r.p.m., will be placed in operation at the company's San Antonio substation.

Twenty-two Per Cent Increase in Appliance Sales Is 1930 Goal of Portland Electric Power Co.

SALES plans by which the Portland Electric Power Company, Portland, expects to sell $700,000 worth of electrical merchandising in 1930 were told at the company's sales meeting, Jan. 25. Among new policies in effect in the company's merchandising department are a "home service" plan and a credit policy by which an installment buying customer can purchase additional equipment before completing payment on merchandise already bought without greatly increasing his installment burden. The meeting was enlivened by music and skits, and one of its main features was an address by E. N. Hurley, Jr., president, Electric Household Utilities Corporation, Chicago. About 50 members of the company sales department and manufacturers' representatives and other guests were present.

The $700,000 quota is made up largely of 1,500 ranges, 200 refrigerators, 1,200 home laundry units, 1,000 vacuum cleaners, and 202,500 lamps. Campaign activities on each of these appliances and on nine minor appliances, scheduled to round out a full year's merchandising activity, were outlined by G. A. Kumler, merchandise manager for the company. This program represents an increase of about 22 per cent over 1929 sales.

The publicity and sales helps for the February Thor washer and ironer campaign were discussed by Ray Andrews, representative of the Botsford-Constantine advertising agency of Portland, and C. R. Musladin of Seattle, Northwest representative of the Manning-Bowman Company, described the sales points of the waffle iron to be concurrently campaigned in that month. Mr. Hurley told of the plans of his company for doubling its 1929 business and reaching a total of $25,000,000 in the sale of Thor products during the year.

With particular reference to the company's newly installed "home service" representative plan, A. C. McMicken, general sales manager, discussed the year's merchandising set-up. The plan is modeled in part after that operating in Philadelphia and contemplates dividing the territory served by the company into districts containing from 2,500 to 4,000 meters with a contact man for each district whose duty it is to see that each of his customers is securing satisfactory service on the electrical appliance already in use, and, through the contacts thus made, to sell and pick up prospects for other appliances. A Kardex record of the result of each call is kept.

In order to minimize the installment burden for good credit risks who desire to purchase more than one appliance at a time, a new credit policy has been adopted by the company as was explained by N. B. Whittier, office manager of the company. This plan permits the addition of the selling price on an appliance to the unpaid balance of a former installment account and the establishment of a new installment contract covering both appliances to extend for a maximum of eighteen months longer.

A feature of the meeting was a skit illustrating how the "home service" plan was expected to operate to improve service to the customer and develop sales and prospects for new business. In addition, several musical numbers were rendered by a quartet composed of sales department employees.

▼

Insull Medals for Two Public Service Co. Employees

Insull medals will be awarded to Eli Watkins, chief engineer at Sterling, Colo., and C. Byron Hall, district manager at Estes Park, Colo., for Public Service Company of Colorado, as a consequence of their acts in saving the lives of Hans P. Greve, Jr., and F. M. Cropper, by means of the Schaefer prone-pressure method of resuscitation.

ELI WATKINS

C. BYRON HALL

On Oct. 20, 1928, Mr. Hall, with J. M. Poling, a Public Service Company lineman, found Mr. Greve in the Big Thompson River Canyon a few minutes after the man had been electrocuted by a copper wire which he had slung across a company power line. Although life was apparently extinct, Hall and Poling persisted in resuscitation endeavors for two hours, and were rewarded by success. Mr. Greve has since been killed by a hit-run motorist in Denver.

Mr. Watkins was present May 3, 1929, when Mr. Cropper, evaluation engineer for Henry L. Doherty & Company, came in contact with high-voltage wires at the Sterling plant of the Public Service Company. Mr. Watkins saw the engineer hurled from a platform 12 ft. above the ground by a shock of tremendous current, and reached him to find no heartbeat or pulse. Working in relays with C. O. Strunk, plant operator, Mr. Watkins forced a resumption of respiration and heart action before medical aid could reach the scene, which is considered a miraculous performance in view of the 90,000 volts that had shocked Mr. Cropper.

▼

Boulder Dam Controversy Nearer Settlement

Washington Correspondence

Following an eleven-day discussion in Reno, Nev., the conference of representatives of the states of Arizona, California and Nevada, which met to discuss the division of the Colorado River waters in connection with the Boulder Dam project, adjourned early in February and reconvened in Phoenix, Ariz., a few days later. With adjournment of the Phoenix meeting on Feb. 10 Arizona's long standing contentions with regard to Boulder Dam power had practically been satisfied.

While the states seemed to be nearer than ever to an agreement on water allocation, the Imperial Valley and Los Angeles interests are still contesting as to their share of the main stream waters. Arizona, according to Senator Hayden, who attended the meeting in Reno before it took up in Phoenix, is willing to concede California her 4,400,000 acre-feet. The difficulty is that of this quantity the Imperial Valley wants 4,400,000 and Los Angeles requires 1,100,000. Of course this deficit might be furnished from the 2,500,000 of unapportioned waters but both parties contend that they can not enter contract without definite assurance of adequate supply from the primary apportionment.

Explaining his position as to Boulder Dam power contracts, as reported in ELECTRICAL WEST, Nov. 1, 1929, p. 260, Secretary Wilbur conferred on Feb. 15 with the members of the Senate and House committees on irrigation and reclamation. Most of the committee members present concurred with Mr. Wilbur's tentative plan though Senator Pittman of Nevada spoke in favor of an alternate scheme shaped to promote industries in Nevada and Arizona.

Senator Pittman wants to divide the 550,000 firm horsepower, dealt with by the Secretary of Interior, equally between California, Arizona and Nevada. Of the estimated 100,000 hp. additional, he would give Utah and New Mexico 40,000 each and 20,000 to California. Anything above 650,000 would be split evenly between the five states.

It is generally assumed that the Wilbur plan, based on a waiting market, will be used in preference to the other which would depend on extensive developments in the future. Meanwhile the Interior Department legal assistants are working on contract forms which soon will be submitted to the parties desiring to enter contract at this time. Just what action will precede the final signing is yet to be determined.

Floodlighting Makes Bridge a Scenic Attraction

AS THEIR contribution to the Light's Golden Jubilee program at Pasadena, Calif., the Pasadena Electragists floodlighted the famous Colorado St. bridge over the Arroyo Seco. The effect obtained was so striking and beautiful that efforts are now under way to have a permanent installation of floodlighting installed for this bridge.

▼ ▼ ▼

FINANCIAL NEWS

1930 Great Western Budget Is $10,474,109

Planning substantial improvements and additions to electrical facilities of central California, the Great Western Power Company of California has adopted a budget calling for the expenditure of $10,474,109 during 1930, according to A. Emory Wishon, vice-president and general manager. Provision for construction to be completed during the year amounts to more than $7,000,000 of the proposed expenditure. Estimated expenses for operation make up the remainder of the budget.

With extensive substation projects as major items, the construction program of the company will be centered in additions to transmission and distribution. systems. An investment of approximately $1,500,000 is being made in Hayward substation and the auxiliary lines and switching station to be built in connection with the new East Bay distributing center. Construction on this project was started during the past month.

Providing space for doubling the capacity of Bush St. substation in the heart of down-town San Francisco, a new two-story building is to be erected as an annex to the present structure. About $300,000 is to be spent on this annex.

Additional equipment is to be installed at both Brighton and Wilson substations, the terminal stations of the 103-mile tie line which joins the systems of the Great Western Power Company and the San Joaquin Light & Power Corporation. This new installation is to take care of additional transmission lines which have been added on the systems of both companies during the past year.

With the 35,000-kw. San Francisco steam plant put into operation in December, 1929, construction of new generating facilities will not be required for the Great Western Power system during this year. Additional power is to be made available after July, 1930, from the Pardee power house of the East Bay Municipal Utility District on the Mokelumne River. The entire output of this 15,000-kw. plant is to be purchased by the Great Western Power Company, which will build a 17-mile 100-kv. steel-tower line to a new switching structure about three miles southeast of Lockford. The new line will tie into the main system of the company through the Brighton-Wilson transmission line.

Northwest Companies' Stock Changes Ownership

Purchase of practically all the common and a large part of the preferred stock of the Seattle Lighting Company by the Portland Electric Power Company was announced in Portland Feb. 20 by Franklin T. Griffith, president of the Portland company. The Seattle company, formerly owned by interests associated with Charles G. Dawes, Chicago banker and now ambassador to the Court of St. James, serves 60,000 customers with gas in the City of Seattle. Mr. Griffith has been named president of the Seattle company and states that that company is to retain its separate identity.

Simultaneously it was announced that the holdings in the Portland Electric Power Company of The Public Utility Holding Corporation, Chicago, had been transferred to the Central Public Service Corporation, Chicago. Proposal to change the name of the Portland company to Pacific Northwest Public Service Company is on the agenda of the annual stockholders' meeting called for March 12 in Portland.

A new issue of $16,000,000 of 6 per cent debentures due 1950 to be offered by the new Pacific Northwest Public Service Company, Portland, and underwritten by Harris Forbes & Company, New York, was likewise announced Feb. 20. The purpose of this issue is to acquire the stock of the Seattle Lighting Company and to retire nearly $7,000,000 of funded debt of the Portland company maturing this year. The capitalization of the Pacific Northwest Public Service Company on completion of the present financing will be 150,000 shares of no par value common stock, $25,121,900 of preferred stocks at their par or liquidating values, $16,000,000 of the current issue of debentures, $36,947,600 of mortgage debt due between 1935 and 1951, and $12,796,200 of bonds and preferred stocks in subsidiary companies.

▼

Edison Co. 1930 Budget Increased by $5,500,000

A total of $23,601,058 will be spent on new construction during the year 1930 by the Southern California Edison Company, Los Angeles. The construction budget for the year is approximately $5,500,000 greater than expenditures for similar purposes in 1929.

Of the total, a little over $18,000,000 will be expended for construction of additional service facilities. The completion of a 133,000-hp. steam-electric generating unit at the company's Long Beach No. 3 steam plant will require an additional $2,000,000. Funds also have been made available for studies and design of a third similar unit to be added to the plant next year.

Other expenditures in the metropolitan area will include approximately $773,000 for the completion of the La Fresa major substation, between Torrence and Redondo Beach, and about $550,000 for additional equipment at the Laguna Bell substation between Montebello and Compton.

Of the amount to be spent for extension of facilities, approximately $7,000,000 will be expended for additional distribution lines and nearly $3,000,000 for extension of transmission lines. A number of new distribution stations also will be constructed to facilitate service from the additional distribution lines.

Construction of the new general offices of the Edison company at Fifth St. and Grand Ave. will be completed this year at a cost of $3,575,000 from the new budget. Work is now well under way on the thirteen-story building which will provide quarters for all the Los Angeles departments of the company.

Other construction includes store and garage buildings in Long Beach and Vernon at an approximate cost of $135,000.

▼

$5,000,000 IN BONDS TO BE SOLD BY EDISON COMPANY—Application has been made to the California Railroad Commission by the Southern California Edison Company, Los Angeles, for authority to issue and sell $5,000,000 face value of its refunding mortgage gold bonds, series of 5's, due 1954. The company proposes to use the proceeds derived from the sale of the bonds for the redemption and retirement of $400,000 of bonds of the Ontario Power Company, and to reimburse its treasury for capital expenditures.

LINE CONSTRUCTION CHIEF ITEM IN PUGET SOUND COMPANY'S BUDGET—The Puget Sound Power & Light Company plans expenditure during 1930 of $300,000 in and near Olympia, Wash., according to L. B. Faulkner, resident manager. This amount will be spent on major line construction, extensions and betterments to the company's system. The principal item in the 1930 budget is the entire reconstruction of the Tacoma-Olympia transmission line enlarging trunk transmission circuits, one on the Pacific Highway, the other via McKenna and Tenino.

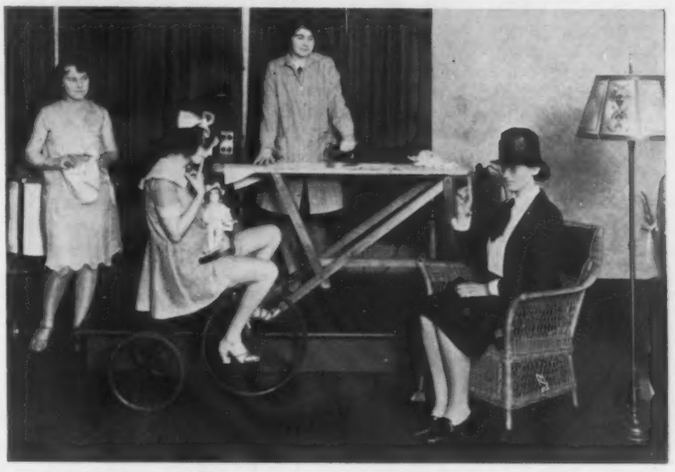
PROFIT FOR YEAR SHOWN BY CITY OF TACOMA REPORT—The Municipal Light Department of Tacoma had gross earnings of $2,211,452.32 for 1929 and a net profit of $702,167.45, after paying operating expenses, including purchase of power provided by the U. S. S. *Lexington*, interest on outstanding bonds, and depreciation on plants, according to its report for the year.

NINETY-NINE PER CENT OF P. G. AND E. CO. RIGHTS EXERCISED—Final payments on Pacific Gas and Electric Company common stock offered at an average price of $40 per share through rights issued to common stockholders of record Sept. 25, 1929, fell due on Jan. 21 Slightly more than 99 per cent of the rights issued were exercised and total payments amounted to $24,746,000. While the percentage of stock subscribed for is about one-half of 1 per cent less than was attained with respect to the last preceding issuance of rights in the early part of 1929, the company regards the outcome as extremely satisfactory in view of the disturbed conditions in the stock market.

▼ ▼ ▼

Pacific Coast Electrical Association

What Not to Do—Electrically



JUST about all the electrical *faux pas* that could be committed in a household occurred in a playlet entitled "The 'Pique' Load," put on at a recent meeting of the Women's Committee of the San Diego Consolidated Gas & Electric Company.

Mrs. Careless is shown in the "still" above trying to get the ironing done, but the fuse is blown, and this is hardly surprising, for attached to one four-way socket this family uses a washing machine, a room heater, an iron, and sometimes a toaster! The small (?) child on the tricycle has just burnt her lip by putting the iron cord, which had been left attached to the outlet and dangling over the board, in her mouth. The danger in all this is explained with the arrival of the electrical inspector, who points out the hazard to life and property of the improper wiring and unsafe practices that she discovers.

The playlet was written by Marge Edwards and Dorothy Hughes, who are seen as Miss Helpful, the inspector, and Miss Thoughtless, the housewife's sister. Loreen Denton is the child, and Edith Laing the housewife, Mrs. Careless. The skit was so well received that it is scheduled for presentation before several San Diego luncheon clubs.

▼ ▼ ▼

Transportation Section Has Final Meeting of Year

The formation of a National Transportation Section aroused considerable interest as one of the major subjects of discussion at the final meeting of the association year held by the Transportation Section, P.C.E.A., Feb. 20-21 at the transportation office of the Southern California Edison Company, Los Angeles. Members of the section strongly favor the organization of such a national section, and work along this line is being promoted with vigor.

The section passed favorably upon a motion to publish a Labor Saving Device Handbook, to contain photographs and specifications of all the newest types of labor saving devices. It is planned to make the book a permanent feature of the Transportation Section and to have it kept up to date at all times by a handbook committee which will function permanently.

Final consideration was given at the meeting to the committee reports which have been selected for publication in the May 15 special convention issue of ELECTRICAL WEST, and March 15 was set as the tentative date for a meeting of the executive committee of the section to be held in San Francisco to consider the part to be played by the section in the N.E.L.A. convention in that city in June.

Subject and Rules for 1930 Essay Contest Announced

"Better Home Lighting, and What I Can Do to Obtain It" is the subject that has been announced for the P.C.E.A. 1930 employee essay contest.

The contest this year is open to members of the immediate families of employees of power companies that are members of the association, as well as to employees themselves who are below the rank of executives and major department heads.

Thirty-nine prizes will be awarded to the winners, as follows: First prize, $100; second prize, $75; third prize, $50; fourth prize, $25; next ten prizes, $15 each; next 25 prizes, $10 each.

After the prize-winning papers have been selected, a prize of $5 will be awarded to each of 50 contestants whose essays will be drawn from a box. Thus each contestant has a chance of winning a prize whether his essay is good, bad or indifferent.

The basis of judging for the first 39 prizes will be 60 per cent for knowledge of the subject, and 40 per cent for originality and clearness of expression. Neither grammatical form, penmanship nor neatness will be considered in judging the papers. A contestant's name is not to appear on his essay, but should be typed or written on a separate card together with his address and placed in a sealed plain envelope to be attached to his essay. Essays may not exceed 1,000 words in length.

To guide contestants in preparing their papers a manual on "Better Home Lighting" has been prepared by the General Bureau of the Commercial Section and may be obtained from the contest director in each of the power companies. The booklet states that each essay is expected to contain (1) a discussion of the subject of home lighting, and (2) a description of what would be required to bring the contestant's home lighting up to the standards described in the manual.

The contest opened on Feb. 15 and will close on March 15. It is under the direct supervision of D. L. Scott, Los Angeles Gas and Electric Corporation, chairman of the educational committee of the General Bureau.

▼

ENGINEERING SECTION CHOOSES HOTEL FRESNO FOR HEADQUARTERS—The Hotel Fresno has been selected as headquarters for the three-day meeting of the Engineering Section, P.C.E.A., to be held in Fresno, Calif., April 16-18. Sessions will be held at the San Joaquin Power Building.

▼ ▼ ▼

Northwest Electric Light & Power Association

Proper Wiring and Contractor-Dealer Interest Discussed at Mid-Winter Commercial Meeting

BESIDES the discussion of ten committees' subjects under the Power, Merchandising and Lighting Bureaus, rural electrification, adequate wiring and contractor-dealer co-operation were given thorough consideration at the fifth annual mid-winter conference of the Commercial Section of the Northwest Electric Light and Power Association at Spokane, Feb. 13-14, 1930. One hundred and twenty delegates from all branches of the electrical industry were in attendance, including a larger number of company sales managers and general managers than have heretofore attended these meetings.

A recommendation to the electrical committee of the N.F.P.A. endorsing the wiring adequacy requirements formulated by the Northwest Section of the International Association of Electrical Inspectors was made in the form of a resolution following discussion of a paper by L. W. Going, chief electrical inspector, Portland, in which it was contended that adequate wiring was a code responsibility. This paper, which was read in Mr. Going's absence by A. C. McMicken, general sales manager, Portland Electric Power Company, Portland, brought out the fact that the National Electrical Code should contain provisions for adequacy of feeder, branch circuit and outlet capacities sufficient to take care of the normal uses of the current consuming public, as a means of correcting abuses, and to open the way for the sale of electrical appliances. The resolution favored in general terms the inclusion in the code of such provisions, pointing out that the lack of such provisions had been responsible for a large amount of inadequate wiring which had worked a hardship on the public and the electrical industry alike in that it had made difficult the sale of current-consuming devices.

Among other resolutions passed by the meeting was one recording respect for the memory of C. T. Hutchinson, president, McGraw-Hill Company of California, San Francisco, whose recent death was announced at the meeting.

Contractor-dealer co-operation was discussed by Roy Kenney, manager, Ne Page, McKenney Company, Portland, who cited the fact that there were some 30,000 contractors in the United States of which only about 3,000 were members of organized groups. Mr. Kenney entered a plea that other branches of the industry lend what help they could to those contractor groups that were organized in the hope that through improved conditions in the contracting field the entire industry would benefit.

Preliminaries to the meeting were composed of a welcome by M. W. Birkett, vice-president and general manager, The Washington Water Power Company, Spokane, who called attention to the importance of commercial development under conditions in which the utility industry now finds itself as contrasted with conditions of a few years ago when it was all the companies could do to provide for the business offered them, and a word of welcome on behalf of the city by A. J. Fabian, commissioner of public utilities, City of Spokane. Responding for the visitors, M. L. Hibbard, vice-president and general manager, Idaho Power Company, Boise, sketched some main factors in the growth of the industry in the past year and showed that with the price per kw.-hr. going down it was necessary to increase the sale of kw.-hr. per customer in order to increase earnings. He pointed out that the increase in kw.-hr. sold per customer on the Pacific Coast proved the value of interchanging information on commercial subjects such as is done at these meetings.

J. F. Orr, manager, Utah Power & Light Company, Ogden, and chairman of the Commercial Section, opened the meeting by urging greater commercial activity along definitely programmed lines and stated that each bureau chairman would conduct a portion of the program in which he would introduce reports of his committees, later opening the meeting to informal discussion of these reports.

▼

Power Bureau

J. D. SCOTT

Portland Electric Power Company, Chairman

The chairman called attention to the new power sales course now in process of preparation by the N.E.L.A.

Taking up some of the problems met with in procuring commercial cooking and baking load, A. B. Chambers, Portland Electric Power Company, chairman of the commercial cooking committee, discussed the initial cost of equipment, the trade-in value of old equipment, wiring costs, electric rates in comparision with prices of other fuels, and competition with gas and oil-fired ovens. His report suggested that in order to combat the advertising in this field by the Pacific Coast Gas Association some advertising on the advantages of electric baking should be carried on by the Northwest Electric Light & Power Association in papers circulating in the baking and restaurant trades. In the discussion on rates it was pointed out that since the baking load is a unit power factor load, it is more valuable than a motor load of equivalent size and a special rate should be made for it. The necessity of constant contact with customers and prospects also was stressed. The committee was instructed to study the question of advertising as suggested in the report, possibly through co-operation with the P.C.E.A.

Calling attention to the arguments that can be used to sell electric heat in industry, the report of the Industrial Heating Committee by Thomas M. Gibbes, Puget Sound Power & Light Company, chairman, suggested that companies make a survey of the possible business in their territories and formulate a definite plan for securing the business available. It was stated that such surveys had invariably shown the prevalence of a large volume of small business which could be readily served electrically. In the discussion the experience of several companies that had promoted the use in their territories of small electric steam boilers for pressing establishments, restaurants, confectioners and others were told. An inspiring sales talk by Sidney W. Coates of the Coates Electric Company, Seattle, in which a plea was made for better salesmanship and more enthusiasm, was interjected at this point. Mr. Coates offered the slogan, "If it isn't done electrically, it isn't done right."

▼

Merchandising Bureau

R. M. BLEAK

Utah Power & Light Company, Chairman

Committee reports were introduced with the statement by the chairman that a large enough job was not being done generally over the territory in that, in the case of several individual units, sales were not being made as fast as new customers were added.

Eight major points of sales resistance and how to overcome them comprised the report of the electric range committee by its chairman, Glenn L. Jackson, Mountain States Power Company, Medford, Ore. Among these points were initial cost, operating cost, increasing the retail outlets, education of salesmen, and wiring. On the subject of wiring the committee had prepared a diagram and bill of material covering a portable wiring layout that could be sold with the range in the case of installation in rented premises with the idea that this wiring could be readily removed and salvaged when the tenant moved out and disconnected his range. Discussion centered around the ways and means of interesting furniture and department stores in selling electric ranges, it being felt that if the influence of these stores could be swung to electric ranges, instead of as is now frequently the case to gas ranges, the amount of sales promotion these stores would release would be a large impetus in the development of a more universal desire to cook electrically. It was suggested that more advertising on electric cookery instead of on trade names of certain electric ranges would help produce these results.

A tabulation of sales policies with respect to refrigeration of 27 companies both within and without the territory of the Northwest Association was included in the report of the refrigeration committee presented by J. C. Plankinton, sales manager, Northwestern Electric Company, Portland, in the absence of J. B. Buman of that company, chairman of the committee. The report concluded with a number of suggestions as to how utility companies might promote the sale of refrigerators in their territory whether they chose actively to engage in the business or not, and suggested that the refrigerator load was of sufficient importance to warrant the continued interest in its successful promotion even though the company did not choose to compete with other dealer outlets. The point of view of the manufacturers was brought out in discussion by E. S. Matthews, Electro-Kold Corporation, Spokane, who urged companies actually selling refrigerators not to make terms with which other dealers could not compete.

That sufficient data on water heating are available to permit any company to make its own survey of its own situation and establish its own policy with respect to rates and conditions of service for this type of load was the major conclusion of the report of the water committee by L. W. Brainard, Idaho Power Company, Boise, chairman. The report stated that in the near future this service will be demanded of public service companies not now rendering it. The goal should be the completely electrified home, which means the inclusion of water heating with its relatively high current consumption and its ample financial return on a kilowatt-year basis. In the discussion a note of warning was sounded against attempting to make a lower step in the rate applicable only to water heating, it being pointed out that the legality of such a rate was questionable. Further discussion centered around the relative merit of a separate water heating rate and a combined rate.

Discussing five essential factors entering into utility merchandising activities, executive interest, the merchandising plan, the merchandise, employee participation and salesmen training, the report of the general merchandising committee by H. W. Cooper, The Washington Water Power Company, Lewiston, Idaho, drew the following conclusions: (1) That each merchandising unit of the association should have a concrete plan covering a full year so as to get the proper balance, and (2) that more attention should be given to the training of salesmen. Sample merchandising plans of two companies were displayed as examples of setting up a balanced program at the beginning of the year. Discussion centered around the training of salesmen and the use of the "home service plan" for securing entree to the home and developing prospects. Securing general employee participation by having the salesmen contact the other employees was said to be effective.

▼

Promotional Rates Committee

H. G. KELSEY

Grays Harbor Railway & Light Company, Chairman

Urging the necessity of analyzing costs before setting up rate structures, the chairman displayed curves illustrating the danger of rates having a low top step and a low minimum charge. Such rates it was shown would not yield the cost of rendering the service to the small customer and thus tended to penalize the large user to take care of this cost. Several different kinds of rates were charted showing the relation between cost and yield graphically to bring out this point.

▼

Lighting Bureau

T. W. FITCH

Portland Electric Power Company, Chairman

The chairman introduced his part of the program by calling attention to the fact that 35 per cent of kw.-hr. sold are for lighting while 65 per cent of the revenues are derived from the sale of this light. The growing appreciation of the operating economies possible from the use of the highest economic level of illumination is pointing a way to large uncultivated fields of revenue. The development of this business requires intensive sales effort by trained men.

The report of the industrial and commercial lighting committee by L. D. Johnson, Portland Electric Power Company, chairman, discussed many phases of contacting architects and builders with the view to having better standards of illumination specified for new buildings. The report urged that utility companies should maintain departments having illuminating engineers available for rendering lighting service to builders. These departments should stand ready not only to check plans already prepared, but to draw up complete wiring plans and specifications when called upon. The report presented data showing the ratio of light to power which proved light to be the better producer of revenue and which showed further that a larger field for expansion existed in lighting than in power applications. In the informal discussion several companies told of their efforts to work with architects in a consulting capacity and indicated that headway was being made in this regard.

Drawing attention to the fact brought out in former reports that street lighting is a commodity to be sold, G. L. Corey, Pacific Power & Light Company, The Dalles, Ore., in presenting his report of the street and highway lighting committee, of which he is chairman, urged that companies designate a certain individual to develop this business. This department head should survey his territory for potential business and should assist improvement associations and community clubs in preparing petitions to city councils and otherwise keep the subject prominently before city officials.

The report further recommended that a manual covering systems, equipment, zoning, and general engineering data on street lighting be published for the aid of the street lighting departments.

As to highway lighting, the report recommended that a committee of the association be appointed to assist in the preparation of state legislation authorizing state and county boards to install and operate highway lighting systems. The revenue from the use of rural lines for highway lighting and its effect on rural electrification was brought out.

In discussion on the report the advertising value of street lighting was stressed and it was suggested that part time burning be discouraged through the establishment of a proper rate. On the suggestion that a more uniform rate throughout the territory be established, it was decided that a number of difficulties would make this impossible. It was the consensus of opinion, however, that a fresh study of street lighting rates by the individual companies might profitably be undertaken.

Citing that the potential annual gross revenue from electrical advertising is equal to the population of the community multiplied by $1.50, and that it costs only 7½ cents to secure every dollar of gross revenue in this field, H. C. McDaniel, Pacific Power & Light Company, Walla Walla, Wash., chairman of the electrical advertising committee, discussed methods of securing this business. His report took up in turn the electric sign, illuminated billboards, window lighting, and floodlighting, touching in each case on the advertising value to the customer, the revenue value to the utility, the potential market, and the selling plan. Development of this business through co-operation with the sign manufacturers, with electrical contractors, and with architects and builders was recommended.

The home as a fruitful field for new revenue in lighting and the necessity of continuous education of home owners as to the aesthetic and practical values of good home lighting were stressed in the report of the home educational lighting committee by Mr. Fitch. It was suggested that utility company employees be encouraged to bring the lighting of their own homes at least up to the "conservative ideal," and to this end one company is preparing a course for its women employees on home lighting in the hope that employees so instructed will be able to spread the story among their social and business acquaintances. New outlets for increasing residential lighting consumption were cited as being outdoor lighting during the Christmas season, and garden lighting. The report named the following as the three most effective appeals for better home lighting:

1. Old fixtures are out of date—get modern.
2. New fixtures have a better appearance and make for more cheerfulness.
3. Protect your eye-sight and the eye-sight of your children.

▼

Rural Electrification

GEORGE HIBBERT

Pacific Power & Light Company, Chairman

The program of this committee was divided into prepared talks on assigned subjects by representatives of state C.R.E.A.'s and by company representatives charged with the responsibility of developing farm load. F. E. Price, project supervisor, Oregon C.R.E.A., Corvallis, reviewed some of the work of the Oregon committee with particular reference to irrigation, dairy and poultry uses and feed chopping. He told of experiments conducted at the Oregon State College indicating which crops were benefited and which were not benefited by irrigation. He further mentioned some of the findings with respect to economic uses of electricity in the dairy and poultry business indicating what increased revenues accrued to the farmers from these uses.

The point of view of the Agricultural College toward the farm electrification movement was expressed by Hobart Beresford, University of Idaho, Moscow. He reviewed the progress made in electrifying the farms of Idaho and cited some of the benefits that had accrued to the farmers through this electrification, concluding that the general improvement in living conditions was attracting better farmers to the state.

The economic value of statistics on rural lines was the subject discussed by A. C. McMicken, in which he made a plea that the companies attempt to secure vital statistics concerning their rural business with a view to determining what return they are making on this business. One of the principal reasons for securing such statistics he

stated was that only on such knowledge could proper rate structures be developed.

J. C. Scott drew attention to the importance of executive co-operation in building farm load, urging that company commercial programs be so set up as to give recognition to the field men for their efforts in developing all kinds of farm business. He stressed the importance of selling the farmer first those devices which had a bearing on the farmer's net profits.

A method by which a farm electrification program might be made effective in local districts was described by W. M. Hamilton, division manager, Portland Electric Power Company, Salem, Ore. The company's set-up in Salem is comprised of three men all having had farm experience and all having been previously employed in other departments of the company. These men are charged with the responsibility of following up new extension business and building load on these new extensions and on existing lines. It is interesting to note that the farmers in the Salem district now insist on bringing their problems to one of these three men whom they consider as competent specialists in their line with a full understanding of farm problems.

▼

Engineering Section at Work on Aberdeen Program

Plans for the seventh annual general meeting of the Engineering Section of the Northwest Electric Light and Power Association to be held in Aberdeen, Wash., March 26-28, were well under way toward completion at the time of going to press. The programming of the subjects to be discussed under each committee was not quite complete in every detail, but it is understood that the official program will be ready for distribution prior to the time this issue of ELECTRICAL WEST appears. Interested persons may secure copies of this program from the office of the secretary of the association, 1206 Spalding Building, Portland, or from the section chairman, D. W. Proebstel, Portland Electric Power Company, Portland.

Headquarters for the meeting will be at the Hotel Morck and reservations may be made direct with the hotel. The Union Pacific will run a special pullman train from Portland to Aberdeen and return, and the Northern Pacific and Great Northern have regular train service between Aberdeen and both Portland and Seattle.

▼

ACCOUNTING SECTION EXPECTS LARGE ATTENDANCE AT MEETING—Preparations for the fifth annual conference of the Accounting Section of the Northwest Electric Light & Power Association to be held in Portland March 17-18, 1930, indicate that this will be the largest and most profitable annual meeting yet held by the section. The meeting has been extended to two days instead of one as formerly, and special effort is being made to present an unusually well-rounded program. Added interest among the accountants in the association is being focused on this year's meeting in part because of the absence of the general convention of the Northwest association this year.

The meeting is to be held in the auditorium of the Public Service Building. Out-of-town delegates are urged to make their own reservations with the Portland hotels.

Meetings

Coming Events

American Institute of Electrical Engineers—Annual Pacific Coast convention, Portland, Sept. 2-5, 1930.

Arizona Utilities Association—Annual convention at Biltmore Hotel, Phoenix, Ariz., April 16-18, 1930.

International Association of Electrical Inspectors, Northwestern Section—Annual convention at Hotel Leopold, Bellingham, Wash., Aug. 25-27, 1930.

National Electric Light Association—Fifty-third convention, San Francisco, June 16-20, 1930.

Pacific Coast Electrical Association—Joint convention with National Electric Light Association, San Francisco, June 16-20, 1930.

Advertising - Publicity Section joint meeting with Commercial Section, San Joaquin Light & Power Corporation Building, Fresno, March 20-21, 1930.

Commercial Section meeting, San Joaquin Light & Power Corporation Building, Fresno, March 20-21, 1930.

Engineering Section Meeting, San Joaquin Light & Power Corporation Building, Fresno, April 16-18, 1930.

National Electrical Wholesalers Association, Pacific Division—Thrice yearly meeting, Hotel Del Monte, Del Monte, Calif., May 8-10, 1930.

Northwest Electric Light and Power Association—Accounting Section meeting, Portland, March 17-18, 1930.

Engineering Section meeting, Aberdeen, Wash., March 26-28, 1930.

▼

Pole Testing Discussed at Wood Preservers' Meeting

At the twenty-sixth annual meeting of the American Wood Preservers' Association held in Seattle Jan. 28-30, the papers to be discussed, which had been prepared in printed form, were presented by their titles only, and discussion immediately followed.

Of particular interest to members of the electrical industry were three papers dealing with termites, three on the subject of preservatives, and one on the non-pressure treatment of poles. These papers were: "An International Termite Exposure Test," by George M. Hunt, of the U. S. Department of Agriculture, Forest Service, Forest Products Laboratory, Madison, Wis., and T. E. Snyder, of the U. S. Department of Agriculture, Bureau of Entomology, Washington, D. C.; "Why Is There a Termite Problem in California?" by Charles A. Kofoid, professor of zoology, University of California; "Termites and the Retail Distribution of Treated Timber Products," by Merle Randall, professor of chemistry, University of California, chairman subcommittee on chemistry, termite investigations committee; "Zinc Chloride as a Wood Preservative, Its Past, Present, and Future," by L. C. Drefahl, of the Grasselli Chemical Company, Cleveland, Ohio; "Fire Resistance of Wood Treated With Zinc Chloride and Diammonium Phosphate," by George M. Hunt, T. R. Truax, and C. A. Harrison, principal chemist, senior wood technologist, and junior engineer, respectively, Forest Products Laboratory, Forest Service, U. S. Department of Agriculture; the report of Committee 4 on preservatives; and the report of Committee 5-5-2 on non-pressure treatment of poles.

C. C. Cook was chosen as the new president. The next annual meeting of the association will be held in Philadelphia.

▼

SAN DIEGO ELECTRIC CLUB ELECTS OFFICERS—Results of its annual election have been announced by the Electric Club of San Diego, Calif. The new officers chosen follow: President—H. A. Cordes, General Electric Company; first vice-president—W. W. Powell, General Electric Supply Corporation; second vice-president — Charles L. Lawrie; and secretary-treasurer—C. M. Allen, both of the San Diego Consolidated Gas & Electric Company. The directors are A. I. Benedict, C. F. Creelman, F. M. Raymond, R. S. Ruffin, and W. H. Talbott, all associated with the San Diego Consolidated Gas & Electric Company.

OFFICERS ELECTED BY ENGINEERS' SOCIETY—At the annual meeting of the Society of Engineers, San Francisco, the following officers were elected for the year 1930-31: President—A. E. Zimmerman, Pelton Water Wheel Company; vice-president—H. T. Sutcliffe, operating department, Pacific Gas and Electric Company; treasurer — W. G. Rawles, East Bay Municipal Utility District, Oakland; secretary—H. D. Miller. The directors elected for the coming two years are R. S. Clark, Bowie Switch Company, and John H. Sheusner, Caterpillar Tractor Company, San Leandro.

SAN FRANCISCO LEAGUE ELECTS OFFICERS—At the annual business meeting of the San Francisco Electrical Development League held Feb. 10 the following officers were elected: President—Ernest Ingold, Ernest Ingold, Inc.; secretary-treasurer—W. A. Cyr, ELECTRICAL WEST. George C. Tenney, ELECTRICAL WEST, Charles L. Huyck, Graybar Electric Company, and William R. Marshall, Westinghouse Electric & Manufacturing Company, were elected members of the board of directors.

LIGHTING SCHOOL TO BE HELD IN SALT LAKE CITY—Sponsored by the Lighting Service Bureau committee of the Electrical League of Utah, a lighting school will be held every evening during the week of March 17 at the Hotel Utah, Salt Lake City. The league has secured as instructor of the classes Samuel G. Hibben, manager, Commercial engineering department, Westinghouse Lamp Company, Bloomfield, N. J.

Personals

F. J. Gannon Advanced by El Paso Company

FRANCIS J. GANNON, since January, 1929, manager of the El Paso Electric Company, Rio Grande Valley Traction Company, and the Mesilla Valley Electric Company, has been

FRANCIS J. GANNON

made president of these companies and a member of their boards of directors. Mr. Gannon, whose headquarters are in El Paso, Texas, has been president of the El Paso and Juarez Traction Company, and a member of its board since his advent in El Paso, and in his new position he will continue actively to manage all four companies.

R. O. Himel, formerly assistant treasurer of the El Paso Electric Company, Rio Grande Valley Traction Company and Mesilla Valley Electric Company, has been made treasurer of the companies. He is now and has been for some time on the board of directors of the El Paso and Juarez Traction Company.

J. B. Ledlie, formerly superintendent of the Mesilla Valley Electric Company, Las Cruces, N. M., a subsidiary of the El Paso Electric Company, has been made vice-president of the Mesilla Valley company.

L. S. Thorne, general superintendent of railways, El Paso Electric Company, is also a member of the board of directors of the El Paso and Juarez Traction Company.

▼

ARTHUR E. ROWE, at one time district sales manager, Garnett Young & Company, San Francisco, has reorganized the H. E. Barrow Company in that city, and the company in future will be known as A. E. Rowe & Company, Inc., with Mr. Rowe as president. Mr. Rowe left recently for a five months' tour of Europe.

DON A. MCCULLOUGH is the newly appointed general auditor for the Pacific Public Service Company and for the Standard Management and Operating Corporation, with their subsidiary organizations. Headquarters of both companies are in San Francisco. The latter company recently has been formed by the Standard Oil Company to exercise supervisory powers over the operating subsidiaries of the Pacific Public Service Company, control of which the Standard company purchased last October. Standard Management and Operating Corporation will take over the activities of the companies formerly taken care of by the United States Engineering Corporation. Mr. McCullough has been acting as auditor of the Coast Counties Gas & Electric Company, Santa Cruz, Calif., a subsidiary of the Pacific Public Service Corporation, and he has also been assistant treasurer of the Coast Counties company. He will retain this latter position, after taking over his new duties. R. D. F. Chisholm, present assistant auditor of the Coast Counties company, will take over Mr. McCullough's duties as auditor.

▼

W. H. Talbott Presides Over San Diego Engineers' Club

WILLIAM H. TALBOTT, superintendent, Electric Meter Department, San Diego Consolidated Gas and Electric Company, has been elected

W. H. TALBOTT

president of the Engineers' Club of San Diego, Calif. This group, which has been in existence about two years, has a membership of 125 embracing all branches of engineering.

Mr. Talbott has been connected with the electrical industry on the Pacific Coast for the past twenty years and has been active in P.C.E.A. engineering committees, having served as chairman of the meter committee and the accident prevention committee. He is this year a member of the meter committee, National Electric Light Association.

Mr. Talbott brings to the club experience that is expected to be of much value to the organization, and the membership is looking forward to a year of progress under his leadership.

Ernest Ingold New President of S. F. Electrical League

AS A RESULT of the recent annual election of the San Francisco Electrical Development League, Ernest Ingold, president, Ernest Ingold, Inc., distributor of Atwater Kent radios, will serve as president of the league for the ensuing year.

Mr. Ingold is a man of untiring energy and always an active worker in any group whose object is the betterment of conditions within its field. He has been actively engaged in association and club work since he came to the

ERNEST INGOLD

Pacific Coast from Illinois several years ago. In Los Angeles he has served successively as a member of the publicity committee of the southern California branch of the University of California, a member of the publicity committee of the Federated Improvement Association, and a member of the City Beautiful Committee. He served as a director of the Advertising Club of Los Angeles for three years, as a vice-president for a year, and as president for still another year, and was at one time a director of the Los Angeles Rotary Club. For four years he was a director of the Pacific Radio Trade Association and its president for two years.

At the present time Mr. Ingold is a director of the Radio Wholesalers Association and the Federated Radio Trades Association; he is president of the Western Music and Radio Trades Association, of which he served as a director last year. He is an enthusiastic golfer, and is a director of the California Golf Club in San Francisco.

▼

GEORGE REINIGER, of the Globe Electric Company, Phil Asron, of the Fobes Supply Company, Harry Byrne, Sr., of the North Coast Electric Company, and A. J. Lutz, of the General Electric Supply Corporation, all of Seattle, Wash., were among the electrical men of that city who attended the recent annual convention of the Pacific Coast division of the National Electrical Wholesalers' Association in Del Monte.

C. R. Higson Heads Utah Engineering Council

CHARLES R. HIGSON, superintendent of distribution for the Utah Power & Light Company, Salt Lake City, has been elected president of the Engineering Council of Utah, the

C. R. HIGSON

parent organization of local chapters of various engineering societies actively functioning in that state.

Following his graduation in electrical engineering from the University of Wisconsin, Mr. Higson spent two years with the General Electric Company and then returned to the university and spent the next four years there as instructor in electrical engineering. In 1912 he returned to Salt Lake City, where he had received his early education, and entered the employ of the Utah Light & Traction Company. A year later he became associated with the Utah Power & Light Company as a substation operator and was soon advanced to the position of assistant engineer. He became successively distribution engineer and assistant to the chief engineer, and in August, 1928, was made superintendent of distribution. He has always taken a prominent part in engineering activities in Utah.

▼

OSCAR L. MOORE, since 1925 manager of the customers' department for the Los Angeles Gas and Electric Corporation, Los Angeles, has been appointed a director of that company to fill the vacancy caused by the death of Champ S. Vance. Mr. Moore joined the organization in 1904 as a clerk in the gas department, later served in the bookkeeping and accounting departments, and became auditor in 1917.

RALPH S. THATCHER of the Thomas Machinery Company, Los Angeles, Calif., has been at the factory of the Electric Machinery Manufacturing Company in Minneapolis for the past six months. On his return to Los Angeles he will specialize on synchronous motor application working with W. C. King, of that company.

J. C. PLATT, who has been a representative of the Edison General Electric Appliance Company in the Idaho territory for the past nine years, has been transferred to the company's Portland office effective March 1. He will divide with C. J. Anderson the responsibility for Hotpoint sales in the Portland territory. J. T. Miller, formerly Hotpoint service station manager in the Edison General Electric Appliance Company's Denver office, and Gordon Scott, his assistant, have been transferred to the sales department as appliance specialists in the Intermountain territory with headquarters in Salt Lake City. Thomas Maycock, formerly of the Salt Lake service station, has been transferred to Denver.

ANDREW W. ROBERTSON, chairman of the board of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., made a tour of the Pacific Coast plants and distributing houses of the Westinghouse company early in February. Mr. Robertson stated at at that time that serious consideration is being given by his company to plans for increasing the output of its plant at Emeryville, Calif. He also announced his intention of attending the N.E.L.A. convention at San Francisco in June.

J. R. HARVEY has been appointed division manager for the Portland Electric Power Company at Vancouver, Wash., to succeed Carl Frost, who died last November. For some years Mr. Harvey has been engaged in the lumber business.

W. D. BURGESS has been transferred from his former position in the engineering department of the El Paso Electric Company, El Paso, Texas, to become power engineer in the industrial service department of that company. In his new position Mr. Burgess will assist E. R. Woolley, head of the industrial service department.

D. W. STRITMATER, formerly in the merchandising department of the Mountain States Power Company, Sandpoint, Idaho, has been transferred to Lebanon, Ore., as local manager, succeeding S. I. Stewart, who has been transferred to the engineering department at Albany.

JOHN G. SEARLS, general sales manager, Indiana Rubber and Insulated Wire Company, Jonesboro, Ind., recently spent four weeks on the Pacific Coast, covering the territory with his Pacific Coast representative, H. F. Boardman, of Los Angeles.

CLARE N. STANNARD, vice-president and general manager of Public Service Company of Colorado, Denver, was host to more than 200 members of the Colorado Press Association during its recent mid-winter conference in Denver.

W. T. ELMGREN, formerly in the operating department of the Portland Electric Power Company at Vancouver, Wash., has been promoted to be division sales manager of that division.

FRANK M. KERR, vice-president and general manager, Montana Power Company, with headquarters in Butte, was the guest of honor at a dinner on Jan. 28 tendered him by his associates, in celebration of his completion of 40 years' service with the Montana Power Company and its predecessor organization. M. E. Buck, general superintendent for the Montana Power Company, who acted as spokesman for the guests, presented Mr. Kerr with a clock, thermometer and barometer. John C. Ryan, assistant general manager of the Montana Power Company, acted as toastmaster.

ROY PAGE, who is well known on the Pacific Coast through his work several years ago on substation and overhead construction in connection with the electrification of the Southern Pacific Railroad's suburban lines in Oakland, Alameda and Berkeley, Calif., and later on the electrification of the interurban lines out of Portland, has been appointed general manager of the Nebraska Power Company. Mr. Page has been assistant general manager of the Nebraska company since 1918.

Obituary

EARL O. JOHNSTONE, credit manager for the Public Service Company of Colorado, died in Denver Jan. 29, at the age of 47. First associated with the Colorado company in 1910 as assistant bookkeeper, in 1925 he achieved the position he held at the time of his death. During his regime the old system of collectors plying their routes on bicycles was abolished and automobiles substituted. He was largely responsible, through the efficiency of his office organization, for the extensive long-time-credit methods fostered by the Public Service Company of Colorado.

EVERETT S. THURSTON, manager of the Building Division of the Westinghouse Electric & Manufacturing Company, Seattle, died of heart failure in that city on Jan. 25. Mr. Thurston had long been identified with the electrical industry both on the Pacific Coast and in Montana. For three years he was Westinghouse merchandising representative for Montana with headquarters in Butte. He had been manager of the Building Division of the Seattle office since August, 1928.

JOSEPH H. BRAGDON, publishing director of *Textile World* and vice-president and general manager of the Bragdon, Lord & Nagle Company division of the McGraw-Hill Publishing Company, New York City, publishers of that paper, died suddenly of pneumonia on Feb. 19 at his home in New Rochelle, N. Y.

Contractors, Dealers and Inspectors

Southern Chapter Reorganizes With Fourteen Self-Supporting Branches

ON A BASIS fully self-supporting, with dues well advanced and guaranteed, the California Elestragists, Southern Chapter, have entered the new year with a complete reorganization and with fourteen local branches, each functioning and active. In its new form the organization is concentrating wholly on contractor problems, treated entirely from the contractor's viewpoint. In this it differs from the former set-up in which affiliation with the California Electrical Bureau sought to direct the organization along lines of industry development as a whole.

Since Jan 1 when the new arrangement went into effect each of these fourteen branches has been set in motion and officers have been elected in each local group. These officers represent the local group on the chapter executive board. Following is a list of the branches and their officers:

Branches	President	Secretary
Bakersfield	James Baker	E. J. Gartley
Glendale	Ran Doll	A. L. Kier
Harbor	Charles Walsworth	G. A. Carvill
Long Beach	L. O. Wetzel	F. A. White
Los Angeles		
Class A	J. G. English	Helen Mikesell Kistler
Intermediate	H. H. Hamm	A. H. Gudie
Motor	L. T. Woods	J. B. Rast
North Orange	F. Stueckle	C. M. Waits
South Orange	C. M. Gilbert	E. R. Christensen
Pasadena	C. A. Rowley	E. D. Faeh
Redlands	E. P. Snyder	G. B. Nash
San Diego	Austin Shaw	George Grover
Santa Barbara	E. W. Huston	John H. Gotchel
Santa Monica	A. H. Ogilvie	R. L. Doman
Whittier	Frank Holland	A. L. Castor
Riverside	D. Coldren	C. W. Voorhies

The headquarters for the Southern Chapter have been maintained at 609 Cotton Exchange Building, Los Angeles, where formerly the joint offices with the California Electrical Bureau were maintained. The Bureau has discontinued its office in Los Angeles. At headquarters Frank Connolly, executive secretary of the Southern Chapter, is assisted by Fred White, A. H. Gudie and Helen Mikesell Kistler.

The program undertaken by the association consists of a study of the local situation and individual treatment of that situation. Where these local problems touch state or national activities it is planned that the contractors' interests be undertaken aggressively by the association.

Dues have been raised to $10 per month, which includes national and state dues, and in all cases have been paid or guaranteed in advance for the year.

President Glenn Arbogast, of the state association, declares this chapter to be in better condition than at any time during the past several years. This he attributes to the able leadership of Frank Connolly and to the new policy adopted.

▼

GOLF—The California Electragists, Southern Chapter, held their first monthly golf tournament at Royal Palms Country Club on Tuesday, Jan. 28. The turnament was arranged only a week before the date of play and only a few members participated. Dave Baird of Santa Monica won first prize with a gross score of 94, and R. P. Machtolf of Glendale captured second prize with a snappy 96. The blind bogey prize was won by Fred White, secretary of the Long Beach branch. Those who "also ran" were E. Gielow, Fullerton, 99; Jack Walsworth, San Pedro, 97; and Art Ogilvie, Santa Monica, 109. Play at the nineteenth hole ended in a tie all the way around. The next tournament will be held on a course in Los Angeles toward the end of February. Some of the high lights of the play were a long putt by Gielow on the twelfth hole for a par three; long driving by Walsworth; and Dave Baird's socks.

▼ ▼ ▼

At Palm Springs

Knupp and Fairnie, in person, contractors who have made Palm Springs all electric

▼

HUME & RUMBLE, LTD., Vancouver and New Westminster, B. C., have been awarded contract for the complete electrical installation in the new Royal Bank of Canada Block in Vancouver. This contract amounts to approximately $80,000 and is one of the largest electrical contracts awarded in Vancouver during recent months. The building will be seventeen stories in height and occupies a commanding position at the junction of the two leading business streets of downtown Vancouver.

▼

THE CITY ELECTRIC COMPANY, Eighth Ave. and Main St., Vancouver, B. C., has secured the adjoining store to house its growing motor repair business. The firm is installing additional equipment, and is now able to handle all repairs to motors and other electrical machinery, as well as the usual electrical contracting and repair work.

▼

Tells of Remotorization Program for Industry

Louis Kalischer, of Brooklyn, N. Y., national chairman of the Motor Section of the A.E.I., was a recent visitor in Los Angeles, on pleasure, so he thought, but was pressed into service by Frank Connolly, executive secretary of the Southern Chapter, California Electragists, to inaugurate a movement for remotorization. Mr. Kalischer is author of a similar plan which is being sponsored by the New York Electrical League and which has received the endorsement of all branches of the industry in that city. No sooner had Mr. Connolly heard of it but he called together representatives of manufacturers of motor equipment, motor dealers, and members of the Chamber of Commerce of Los Angeles, and preliminary steps were taken for the setting up of a similar plan in the Southwest.

Mr. Kalischer addressed the Motor Section of the Los Angeles branch on Feb. 11. He began by reciting the progress which had been made at the recent meeting in Milwaukee between the national motor section and representatives of motor manufacturers for the betterment of motor distribution policies.

He outlined what progress had been made in (1) arriving at more specific definitions of dealers entitled to be classified as "motor specialists," (2) in improved franchise conditions, and (3) in revisions of discounts to dealers. Particularly significant was the progress made on discounts for motor

equipment of 200 hp. and over and for synchronous equipment.

Following this report Mr. Kalischer described the remotorization program undertaken by the New York electrical interests, following which steps were taken by the Motor Section to organize similar promotion in southern California.

▼

Los Angeles Group Names New Officers

Harry H. Hamm, of Hamm & Smith Electric Company, Los Angeles, recently was elected president of the Association of Electrical Contractors, affiliated with the Los Angeles Electragists and known as the Intermediate Section of the Los Angeles group. Mr. Hamm succeeds R. M. Fry as president. A. C. Arnold, of the Electric Installation Corporation, became vice-president succeeding Mr. Hamm, who is now president. J. L. King is treasurer. A. H. Gudie is executive secretary for this group.

Under the organization form of this association the members elect a board of five who in turn select the president and vice-president. This board consists of L. A. Duncan, of the Duncan Electric Company; G. E. Norberg, of Johnson & Norberg; Paul M. Rodet, of the Everready Electric Company; Harry G. Self, of Self & Dalbey, and J. L. King.

This group has been organized under the leadership of Harry W. Biddle, legal counsel and advisor. It meets every second Monday for a short business session, closing promptly at 10 o'clock.

▼

Inspectors Decide Next Convention Place

Bellingham, Wash., tentatively chosen at the last convention of the Northwestern Section of the International Association of Electrical Inspectors as the meeting place of the next annual convention, was confirmed in that choice by the executive committee early in January.

The dates of the meeting are Aug. 25-27, 1930, and the convention headquarters will be at the Hotel Leopold. Officers of the association are: President—C. H. Fletcher, Vancouver, B. C.; vice-president—C. B. Gleason, Tacoma; secretary - treasurer — F. D. Weber, Portland. The following are members of the executive committee: H. S. Jenkins, Bellingham, Wash.; C. E. Carey, Seattle; S. B. Clark, Portland; William Myers, Salem, Ore.; and J. H. Sroufe, Portland.

▼

THREE TELECHRON CLOCKS with 9-ft. dials will be installed in the recently completed Pacific Coast Terminals building at New Westminster. They will be the largest telechron clocks in the Dominion of Canada. Wallace Electric Company, Vancouver, B. C., has the contract.

Syndicate Takes Control of Motor Concern

A syndicate comprised of a number of prominent electrical men in the Southwest, and headed by J. O. Case, former assistant local manager of the General Electric Company, Los Angeles division, has just taken over the interests of A. W. Wotkyns in the Qualitiy Electric Works, of Los Angeles, a pioneer industrial contracting firm. Mr. Wotkyns sold his interests, he announced, in order to rest and regain his health.

Under the newly formed organization Mr. Case becomes president and general manager of the Quality Electric Works. J. B. Martin, vice-president of the former organization, retains that position. G. E. Decker becomes secretary and treasurer. The board of directors consists of the officers, J. M. Bowden, who was a former director, J. G. Monohan, O. H. Ensign and R. E. Cunningham, the two last named representing the syndicate as trustees.

No changes have been made in the operating personnel of the organization. J. M. Bowden continues in charge of the motor repair department, one of the largest and best equipped in the Southwest. The engineering department consists of J. R. Wilson, a frequent contributor to ELECTRICAL WEST, Ross Bartlett and L. H. Ellett.

The Quality Electric Works was established in 1895 and incorporated in 1913 with S. M. Karicofe as president. About a year ago Mr. Karicofe retired from business and A. W. Wotkyns became president in his stead. Mr. Karicofe died soon after leaving the company.

An interesting fact concerning the company was brought out at the time of its reorganization a year ago. It was stated that sixteen years ago the firm consisted of a president, secretary-treasurer, and seven employees, and was doing an annual business of $20,000. Recently the personnel included 42 with an annual business of over $300,000.

A revamping of the office and display space is now being undertaken to conform with newer ideas in motor shop operation.

▼

Red Seal Cup Award Repeated This Year

Based on the number of Red Seal homes wired during 1929, a contest was conducted by the Southeast Electric Club, Huntington Park., Calif., under the sponsorship of the Associated Wholesale Electric Company, electrical jobbers of Los Angeles, which offered a silver loving cup to the winner. The trophy was won by Frank R. Hannon of the Keystone Electric Company, Walnut Park, Calif. At a meeting of the club held Jan. 9 the cup was presented to Mr. Hannon by William F. Brainard of the Associated Wholesale Electric Company.

That this contest was effective can best be shown by the fact that 65 Red Seal homes were built in this territory during 1929 as compared with only eight during 1928. Competition was keen. Mr. Hannon's company built 24 homes and was closely followed by the South Gate Electric Company with 22. So much interest was taken in the contest that the Associated Wholesale Electric Company has announced a similar contest for 1930.

Officers of the Southeast Electric Club are: President—Louis J. Meller, Meller Electric Company, Lynwood, Calif.; secretary and treasurer—Alton L. Pryor, chief of the electrical department, City of Huntington Park.

▼ ▼ ▼

"Congratulations," said Bill Brainard to Frank Hannon, while officers and luminaries looked on in accord

Manufacturer & Distributor

Laidley Co. of Portland to Handle G.E. Refrigerators

SUCCEEDING the Arch Electric Company as Portland distributor of General Electric refrigerators, The Laidley Company was organized and opened for business early in January with general offices at 603 Terminal Sales Building, Portland. The company will distribute the product in the entire state of Oregon, parts of southern and eastern Washington, and parts of Idaho. It maintains a branch at West 923 Sprague Ave., Spokane, and occupies the former headquarters of the Arch Electric Company at 194 Tenth St., Portland, as its Portland retail store and warehouse.

George Boring (left), Portland manager, General Electric Supply Company, talks things over with H. D. Laidley, president, The Laidley Company, recently appointed disbtributor of G. E. refrigerators in Oregon and parts of Washington and Idaho

H. D. Laidley, for many years with the General Electric Company and the National Lamp Works and more recently vice-president of R. Cooper, Jr., Inc., distributor of G. E. refrigerators in Chicago, is president of the new company. C. W. Hartenfels, formerly with the General Electric Company in Chicago, is secretary and a director of The Laidley Company. The Spokane branch will be managed by O. D. Miller, who likewise came from the General Electric Company in Chicago.

▼

COMPANY NAME CHANGED—The name of the Edison Electric Appliance Company, manufacturer of Hotpoint electric appliances and an affiliate of the General Electric Company, has been changed to Edison General Electric Appliance Company.

THOMAS MACHINERY COMPANY, 912 East Third St., Los Angeles, has been appointed representative in southern California and Arizona of the Electric Furnace Company of Salem, Ohio. In this connection O. H. Hedrich, formerly in charge of design and construction for the Municipal Light Plant of Pasadena, Calif., and now associated with the Thomas Machinery Company, has been at the Electric Furnace Company's factory studying the design and application of its equipment. Upon his return to Los Angeles, he will specialize on Electric Furnace applications. In northern California C. F. Henderson, Call Building, San Francisco, represents the Electric Furnace Company and his specialty man on this account is H. A. Johnson.

HOLOPHANE OFFICIAL VISITS COAST—Charles Franck, vice-president and general manager, The Holophane Company, Inc., New York City, made his annual tour of the company's Western headquarters during the past month. Accompanied by George Rucker, San Francisco representative of The Holophane Company, Mr. Franck visited Denver, Salt Lake, and San Francisco, and on Feb. 6-8 attended the convention of the National Electric Wholesalers Association at Del Monte, Calif. Following the convention Mr. Franck left for the company's offices in Los Angeles, to confer with Frank A. Hansen, Los Angeles manager. He is expected to return to the Coast this year in August.

PACIFIC ELECTRIC MANUFACTURING CORPORATION TO SUPPLY CIRCUIT BREAKERS—Contract has been awarded the Seattle branch of the Pacific Electric Manufacturing Corporation by the Puget Sound Power & Light Company for six 73-kv. oil circuit breakers, to be installed in its White River hydro-electric generating station. The order involves approximately $35,000. Charles H. Cutter is in charge of the Seattle branch.

MANNING-BOWMAN COMPANY has established a new sales representative in the Northwest states in the person of C. R. Musladin who will make his headquarters in Seattle. Mr. Musladin has for sixteen years been with Alexander & Lavenson, San Francisco, where recently he held the position of sales manager.

THE NATIONAL WOOD PRODUCTS & CROSSARM COMPANY, Tacoma, under a contract recently signed, becomes one of three crossarm factories in the United States which will furnish all the crossarms used by the General Electric Company throughout the United States during 1930.

WOOD PRESERVING COMPANY ORGANIZED IN NORTHWEST—Articles of incorporation have been filed at Olympia, Wash., by the West Coast Wood Preserving Company, a corporation organized with an authorized capital of $800,000 and specifically authorized to operate wood preserving plants. The timber treating plants of the J. M. Colman Company, and the Pacific Creosoting Company, both of Seattle, have been leased for a long period to the West Coast Wood Preserving Company, which will operate both plants hereafter as a consolidated property. The officers of the new company are: President—Laurence J. Colman; vice-president—L. C. Henry; secretary-treasurer—A. D. Barrall; and manager—H. E. Horrocks.

GENERAL CABLE OFFICIALS VISIT COAST—A leisurely and comprehensive tour of Pacific Coast offices of the General Cable Corporation and of the Standard Underground Cable Company, Rome Wire Company and Dudlo Manufacturing Company and other General Cable subsidiaries was made last month by O. G. F. Markhus of the New York headquarters of General Cable. A similar "get acquainted" tour of the Western territory will be made in March by George Thompson, comptroller of the General Cable Corporation, and on March 1 Oliver R. Grant, an engineer in the New York office of the corporation, will become a permanent member of the General Cable Pacific Coast staff.

ELECTRO-KOLD BOOSTS PROFITS—Net profits for the Electro-Kold Corporation, of Spokane, increased 20 per cent in 1929 over 1928 according to a recent announcement of W. L. Masterson, general manager. In his report Mr. Masterson pointed out that domestic business increased and that export trade showed an increase of 800 per cent over the previous year.

TO MANUFACTURE NEON SIGNS IN SEATTLE—The General Illuminating Company, formerly of Aberdeen, Wash., has taken over the building at 1530 Westlake Ave., Seattle, formerly occupied by the Pacific Ornamental Iron Company, and will remodel it as a plant for the manufacture of animated Neon signs.

ALBERT W. ROCKWELL, who has been connected with the Appleton Electric Company's activities on the Pacific Coast for the past two years, has been made district manager of the San Francisco office of that company, with headquarters at 655 Minna St.

GEORGE A. HILL, formerly associated with Curtis Lighting, Inc., in Los Angeles, has joined the Los Angeles staff of The Electric Corporation as a lighting specialist.

H. B. SQUIRES COMPANY MOVES—The San Francisco office and warehouse of H. B. Squires Company, manufacturers' representative, have been removed to 1277 Howard St.

N.E.M.A. Street Lighting Section Organized

A Street Lighting Section, composed of six companies manufacturing standards and equipment for street lighting, has been organized in the National Electrical Manufacturers Association. F. H. Winkley, of the General Electric Company, is chairman, and L. A. S. Wood, of the Westinghouse Electric & Manufacturing Company, is secretary of the section. Comparison of competitive types of street lighting equipment, methods of determining costs of standards, and the proper classification and collection of sales statistics are matters that have come up for discussion at meetings that have already been held.

The following manufacturing companies are represented in the section: Line Material Company, General Electric Company, Union Metal Manufacturing Company, Westinghouse Electric & Manufacturing Company, Wheeler Reflector Company and the Electric Railway Equipment Company.

▼

NEON CORPORATION TO BUILD IN LOS ANGELES—A two-story office structure is to be erected on its plant site on Venice Boulevard, Los Angeles, by the Claude Neon Electrical Products Corporation, Ltd., according to an announcement made last month by Paul D. Howse, president of the corporation. The new building, to cost $50,000, will occupy a site 95 x 50 ft. and will provide 5,000 sq.ft. of office space. It will contain a two-story concrete vault, 12 ft. wide by 32 ft. long, which will be used to store the corporation's sign patterns.

JOBBER SENDS RED SEAL QUESTIONS AND ANSWERS—What one jobber is doing to promote the Red Seal plan in Los Angeles is indicative of the new interest being aroused universally by the success of the plan during recent months. The Graham-Reynolds Electric Company, of Los Angeles, recently sent out a questionnaire to all contractor-dealers on their lists. This questionnaire asked and answered twenty questions which cover practically every phase of the requirements and advantages of the Red Seal plan to all concerned. It also gave reasons for certain of the requirements which are sometimes not understood.

▼

Room for Both

R. J. Cordiner of Seattle (left) Northwest representative, Edison General Electric Appliance Company, and R. M. Chester of Portland, representative in the same territory for Landers, Frary & Clark, evidently agree that there is room for both Hotpoint and Universal appliances in the Northwest

Kelvinator Business Grows in Northwest

Addition of a complete electrical refrigeration department to handle domestic and commercial lines of the Kelvinator Sales Corporation has been announced by the Standard Furniture Company, Seattle, under direction of L. Kenneth Schoenfeld, junior member of the firm. The company has been appointed Kelvinator distributor for western Washington and will appoint dealers in other cities in its territory.

S. E. Jarvis, of the Jarvis Electric Company, Ltd., 898 Granville St., Vancouver, B. C., distributor in British Columbia of Kelvinator refrigerators, reports that his firm since last October has taken delivery of about 55 per cent more Kelvinators for local orders than during the same period twelve months previous.

▼

VANCOUVER COMPANY TO MANUFACTURE ALARM SYSTEMS—A new type of closing circuit burglar and firm alarm system has been invented and patented by J. D. McDaniel, electrical engineer of Vancouver, B. C. Mr. McDaniel has organized the McDaniel Systems, Ltd., a Vancouver company which will manufacture these electrical alarm systems.

WESTERN REPRESENTATIVES APPOINTED—The Viking Tool & Machine Company, Inc., of Brooklyn, N. Y., designers and builders of cable and rope manufacturing machines, has appointed Ralph B. Clapp, 15 South Almansor St., Alhambra, Calif., as its representative in southern Cauifornia, and James H. Southard, 682 Mission St., San Francisco, as central and northern California and Nevada representative.

▼ ▼ ▼

New Building Indicates Optimism of Wholesale Distributor

MODERN display rooms, well lighted offices and ample warehouse space are all adequately provided for in the General Electric Supply Corporation's up-to-date building at 1100 West Broadway, Long Beach, Calif. The new headquarters, opened for business on Jan. 20, 1930, is a branch of the Los Angeles Division of the company, of which F. J. Airey is manager, and replaces a building into which the company moved five years ago and with increasing business had completely outgrown. Hotpoint electric ranges and appliances, Edison Mazda Lamps, RCA Radiolas and Telechron electric clocks are all carried at this location in addition to the regular lines of General Electric products. The public was invited by W. M. Werner, Long Beach manager, to view the new building on the opening day, "especially," his invitation read, "to see the modern display rooms which always will be open for their inspection of the latest in electrical servants for the home, office and factory."

New Equipment

New Model Thor Washer

The Hurley Machine Company, Chicago, announces a new *de luxe* model Thor agitator-type washing machine designed for a market where slightly higher priced washers are demanded. The tub of the washer is made of Mono metal and is mounted on a heavy pressed steel base and four pressed steel legs electrically welded and finished in grey lacquer. The swing wringer is made entirely of metal, cadmium plated; it has balloon rolls and can be locked in four different positions. Retail price, $135.—ELECTRICAL WEST, March 1, 1930.

▼

Appliance Timer

A new appliance-timer cord set that enables the Hotpoint range timer to be used in a number of timing operations is being introduced by the Edison Electric Appliance Company, Inc., 5600 West Taylor St., Chicago. To operate, the plug on the cord set is inserted in any convenience outlet, the range timer is then plugged in on a three-point opening and the appliance to be controlled is plugged in on another opening. The range timer can then be set to turn the controlled appliance on and off at any time desired. Retail price of cord set, $2.75.—ELECTRICAL WEST, March 1, 1930.

Sandwich Toaster

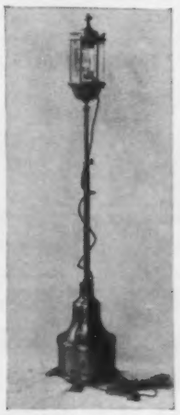
A new Everhot sandwich toaster that toasts two large sandwiches in 1½ minutes has been placed on the market by The Swartzbaugh Manufacturing Company, Toledo, Ohio. Mechanical features of the toaster include: Chromium plate over nickeled brass, four-way floating hinges that permit contact with the grids irrespective of whether or not the bread is evenly cut, and grids that heat evenly and will not warp. Retail price, $12.50.—ELECTRICAL WEST, March 1, 1930.

▼

Uviarc Sun Lamp

A health lamp that is compact and artistic in appearance and that consumes only a moderate amount of current is the Uviarc sun lamp of the General Electric Vapor Lamp Company, Hoboken, N. J. The source of light in the Uviarc is the Cooper-Hewitt quartz burner, so protected with filter glass that it is unnecessary to wear goggles while taking sun baths, yet giving sufficient illumination (1,000 cp.) for close work to be done under it while a sun bath is in progress.

The lamp weighs about 25 lb. and can be raised and lowered and the head



tilted to one side. One type is rated at 110-125 volts, a.c., 350 watts, 3.8 amp., and another at 110-125 volts, d.c., 300 watts, 2.75 amp. Retail price, $108.—ELECTRICAL WEST, March 1, 1930.

Electric Range Unit

An electric range surface unit obtainable in either the open or closed type that can be adapted to any standard make of electric range through the use of various sized chromium plated adapter rings has been placed on the market by Wesix, Inc., San Francisco.

The feature of this unit is a shunt arrangement which momentarily shunts out a section of the risistance, thereby augmenting the normal capacity of the plate from 25 to 50 per cent, depending upon the size of the unit. In the 1,500-watt unit, for instance, enough resistance is shunted out to make a 2,000-watt plate, which will provide an intense heat until an expansion bar opens the shunt and allows the full resistance to be cut in and returns the operation of the unit to normal. This acceleration, being only momentary, does not increase the normal rating of the unit.

The surface of the closed unit is grooved, thereby augmenting its radiating capacity, and quartz "eyes" are provided in this unit so that the sections of the coils are visible when in operation. Retail price, $10.—ELECTRICAL WEST, March 1, 1930.

▼

Tumbler Plate Receptacle

The Arrow Electric Division of The Arrow-Hart & Hegeman Electric Company, Hartford, Conn., has recently placed on the market a new No. 7770 tumbler plate receptacle for use with any standard Bakelite tumbler switch plate. The new receptacle makes it unnecessary to stock special combination plates as No. 7700 may be used with any gang tumbler switch plate.—ELECTRICAL WEST, March 1, 1930.

Sectional Range

A new electric kitchen range that can be built up or taken down at will like a sectional bookcase has been introduced to the market by the Armstrong Electric & Manufacturing Company, of Huntington, W. Va. The complete unit comes in sixteen parts, making the same range adaptable to requirements of any size. By shifting of parts a range for the small or large home, for the left-handed or right-handed woman, the tall or short woman, a range with the oven below and the range surface on top, with the oven on one side and the range surface on the other, and many other combinations can be provided. It is possible to buy part of the range, such as oven, base and legs to start with, adding other parts as need develops.

All the parts are light and easily handled, fitting snugly into each other. The finish is black and white enamel

with nickel trim, and ovens are equipped with oven heat indicator.—ELECTRICAL WEST, March 1, 1930.

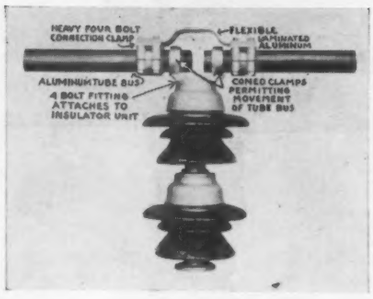
▼

Electric Refrigerators

A new line of domestic electric refrigerators has been announced by the Kelvinator Corporation, Detroit, Mich. The line consists of twelve self-contained models in sizes and capacities to meet the needs of every modern home. There are five de luxe, four standard and three utility models. All of the new models are equipped with Ice-O-Thermic tubes, a simple device which automatically changes the load as it rises up and down inside the refrigerator. Automatic regulation maintains a cold storage temperature, below freezing, in the cold storage department, and a 40- to 50-deg. temperature throughout the food chambers.

All of the cabinets of the de luxe, standard and utility models are of new modernistic design, and are at a low convenient height to give the maximum degree of accessibility and convenience. In the de luxe models an electric light located in the interior of the refrigerator lights all parts of the food chamber.—ELECTRICAL WEST, March 1, 1930.

Expansion Joint


HEAVY FOUR BOLT CONNECTION CLAMP
FLEXIBLE LAMINATED ALUMINUM
ALUMINUM TUBE BUS
4 BOLT FITTING ATTACHES TO INSULATOR UNIT
CONCO CLAMPS PERMITTING MOVEMENT OF TUBE BUS

A new form of expansion joint especially adapted for long sections of heavy aluminum tube bus has been developed by the Delta-Star Electric Company, Chicago.

To the cap of the standard insulator is bolted an aluminum alloy saddle with two projections, the interior surfaces of which are cone shaped. The tubular bus resting on these rounded surfaces is free to move and there is no binding due to conductor sags.

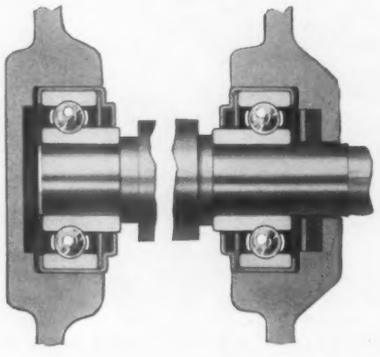
To each section of the bus is clamped a sheaf of thin flexible aluminum strips which permit moving of the tubes as they expand or contract. All the bolts and nuts are made of Duralumin.—ELECTRICAL WEST, March 1, 1930.

▼

Motor Ball Bearing

A self-sealed, self-lubricated ball bearing which, according to the manufacturer, reduces mounting costs and at the same time increases bearing efficiency in service life, is announced by the New Departure Manufacturing Company, Bristol, Conn.

The N-D-Seal bearing, as it is called, is made only in the smaller sizes and consists of a single row ball bearing of the non-loading groove type, permanently fitted into a metal case or shell. This shell is shaped on one side of the bearing so as to contain a felt closure which fits over the ground outside diameter of the extended bearing inner



ring, thus forming an efficient seal both for the retention of lubricant and the exclusion of dirt.—ELECTRICAL WEST, March 1, 1930.

G-E Fiberduct

A new non-corrosive raceway for under-floor wiring in concrete floors, known as G-E Fiberduct, has been announced by the General Electric Company, Merchandise Department, at Bridgeport, Conn. This system is so designed that neat appearing outlets may be installed safely and economically at any point and at any time during the life of the building.

The duct is oval in shape and is composed of impregnated fiber which successfully resists corrosion. The wall thickness is 3/16 in. and the cross sectional area is 3 sq.in.—ELECTRICAL WEST, March 1, 1930.

▼

Socket and Handle Cap

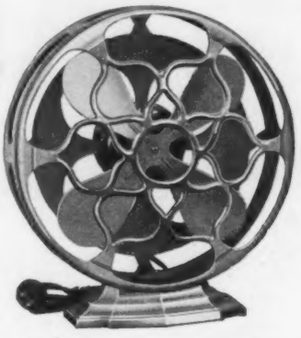
A new two-way socket and handle cap in Bakelite are the forerunners of a complete Bakelite line being marketed by the Eagle Electric Manufacturing Company, 59 Hall St., Brooklyn, N. Y.

The two-way socket, in blended color designs, is small and neat and of sturdy

construction. List price of socket, 25 cents; handle cap, 15 cents.—Electrical WEST, March 1, 1930.

▼

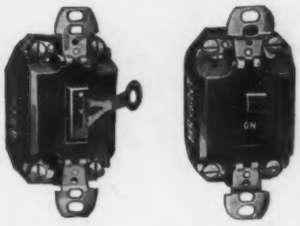
Art Fan



A decorative design has been given to the new Model 60 art fan recently placed on the market by Robbins & Myers, Inc., Springfield, Ohio. The fan is obtainable in either a dark statuary bronze or a soft sage-green finish, and will operate on either alternating or direct current. Its operation is entirely noiseless, and a rigid guard incorporated in the design gives unusual protection from fan blades in motion. Retail prices of six different models range between $14 and $16.—ELECTRICAL WEST, March 1, 1930.

Tumbler Switches

A new series of flush tumbler switches, wholly enclosed and having both cups and covers made of black Bakelite, is being offered by The

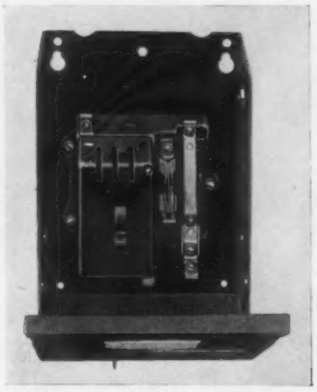


Bryant Electric Company, Bridgeport, Conn. Handles are of brown Bakelite.

Switches in this series are No. 3961 single-pole, No. 3962 double-pole, No. 3963 three-point, No. 3964 four-point, and No. 3970 single-pole quadruple-break, the last named being designed for heavy duty. The cups being especially shallow, 1 15/16-in. wiring space is provided, and due to construction and special Bakelite stops, switches are unusually quiet in operation.

All switches of this series can be supplied with "Glo-Guide," luminous insert or lock-type handles. Nos. 3962 double-pole and 3962-L, with lock-type handle, are illustrated. — ELECTRICAL WEST, March 1, 1930.

▼



Meter Service Breaker

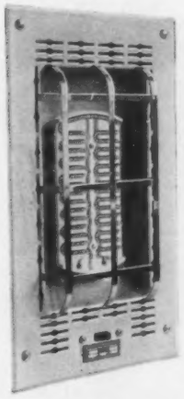
A meter service breaker that eliminates the necessity of using fuses yet operates in the same way to open or close a circuit is announced by the Square D Company, Detroit, Mich. Absence of fuses in the new breaker, the company explains, does away with the problems of sealed main fuses, accessible fuses, interlocking doors and all undesirable features of service switches. Its front operating handle indicates the "on," "off" and "tripped" positions and can be locked or sealed in the "off" position. It is toggle operated and can be reset as easily as an ordinary toggle switch can be operated, and can be easily and quickly wired.—ELECTRICAL WEST, March 1, 1930.

Turbine Motor

To meet a need for a motor housing that would be an integral part of turbine centrifugal pumps requiring vertical motors, the U. S. Electrical Manufacturing Company, 200 East Slauson Ave., Los Angeles, has developed the U. S. Turbo-Pump motor. None of the operating units is exposed and the motor is said to be weatherproof. It is designed with the operating parts fully protected and is symmetrical. When set upon the pump base it is said to offer a very pleasant appearance.—ELECTRICAL WEST, March 1, 1930.

▼

Bathroom Heater



A 1,000-watt, 110-volt flush wall-insert bathroom heater that can be wired to any convenience outlet circuit has been placed on the market by the Apex Manufacturing Company, Emeryville, Calif. The heater is porcelain enameled and is offered in a choice of eight standard colors. It can be built into any standard 3-in. partition. Retail price, $16.—ELECTRICAL WEST, March 1, 1930.

▼

Test-o-Lite

The Test-o-Lite is a handy pocket device no larger than a fountain pen recently placed on the market by the L. S. Brach Manufacturing Corporation, Newark, N. J., for locating burnt-out fuses, electric light and motor troubles, faults in circuits in household electrical appliances, in automobile spark plugs, radio sets and other electrical equipment. When trouble exists in a circuit it is flashed to a small Neon lamp in the top of the tester. It may be used on circuits from 100-500 volts a.c. or d.c. Retail price, $1.50. — ELECTRICAL WEST, March 1, 1930.

High-Tension Switch

A new switch of the vertical break type has been added to its line of air break switching apparatus by the Pacific Electric Manufacturing Corporation, 5815 Third St., San Francisco. This switch has interchangeable parts for any method of mounting, standard bus or switch insulators, and full-floating, self-aligning contacts. No cast copper members are used to conduct current for the blade through the hinge to the terminal.—ELECTRICAL WEST, March 1, 1930.

Recent Publications

PUMP SELECTION—A set of charts for determining the size and style of pump to use for any given condition of capacity and head, as well as the horsepower required to drive it, is offered in Bulletin No. 200 of Goulds Pumps, Inc., Seneca Falls, N. Y. A complete description of the Goulds line of horizontally-split, enclosed-impeller, single-stage, double-suction pumps is also given in this publication.

ROLLER-SMITH BULLETINS—Two new bulletins issued by the Roller-Smith Company, 239 Broadway, New York, are No. 300, covering various types of instruments for resistance measurements, and No. 210, covering portable d.c. ammeters, milli-ammeters, volt-meters, milli-voltmeters, volt-ammeters, galvanometers, circuit testers, shunts and multipliers.

TRENCHING EQUIPMENT—A catalog just issued by The Cleveland Trencher Company, Cleveland, Ohio, is devoted to descriptions of trenchers, back-fillers, trailers, sectional steel manhole forms and accessories, and other underground conduit equipment developed by the Cleveland company.

ELECTRIC TOOLS—A new catalog (No. 20) of electric drills, saws, grinders, valve refacers, reamers and seating stones, and a number of other electric tools, has been issued by The Black & Decker Manufacturing Company, Towson, Md.

ELECTRIC WATER HEATERS—The value of Hall electric water heaters to the utility as off-peak load builders is the subject of a recent booklet of the Hall Electric Heating Company, Inc., 1429 Walnut St., Philadelphia, Pa.

INDUCTION VOLTAGE REGULATOR—The design characteristics and application of the induction voltage regulator are described at length in a 112-page book published recently by the General Electric Company, Schenectady, N. Y.

ELECTRICAL WEST Barometer of Industrial Activity in Western States

THAT operations in the manufacturing plants as a whole in the Western states continued to decrease during January is indicated by reports received on the monthly consumption of electrical energy for power purposes. The January rate of activity after corrections are made for number of working days, was 8.6 per cent under December and 12.7 per cent under January last year. Operations during the current January were the lowest since May, 1928.

The Western manufacturing plants do not appear to have witnessed the improved tendency which was reported for the country as a whole during January. Electrical energy consumption for power purposes in the country as a whole during January was 4.6 per cent above that of December, but was still 8.1 per cent under January, 1929.

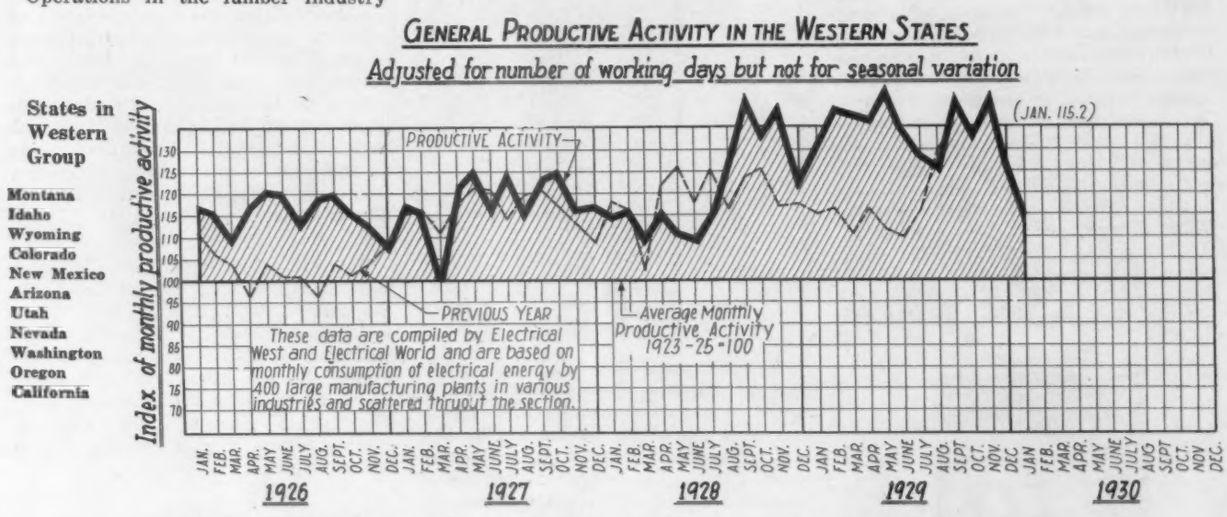
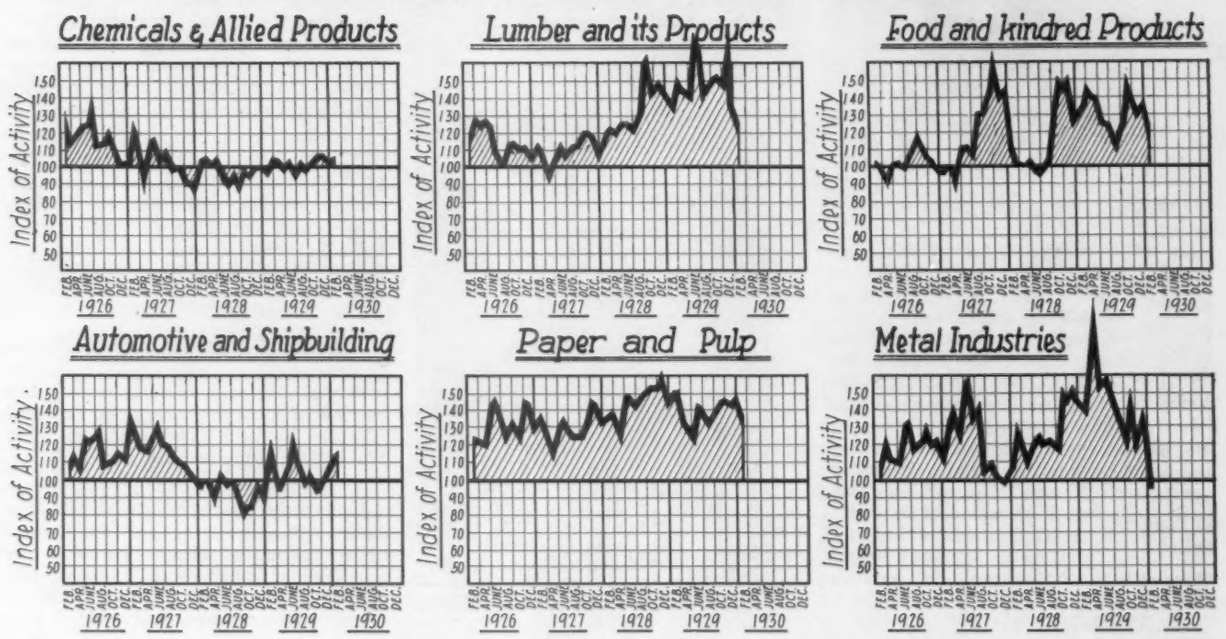
Operations in the lumber industry continued to decrease during January.

The food products industry, another leading industry of the West, also reported a drop in activity during January to a point 10.2 per cent under December and 9.9 per cent under January, 1929.

The metals group of manufacturing companies does not appear to have followed the upward trend reported east of the Rockies.

On the other hand, the following increases in rate of activity as compared with December were reported: Rubber products, 74.0 per cent; stone, clay and glass, 3.4 per cent; shipbuilding, 3.2 per cent; and chemical products, 1.3 per cent.

Indexes of Industrial Activity in the Western States

(All figures adjusted for number of working days.)

	Jan. 1930	Dec. 1929	Jan. 1929	Average for year 1929	Average for year 1928
All industry	115.2	126.0	131.9	135.5	123.2
Chemicals and allied products	107.4	106.0	93.7	100.5	96.9
Food and kindred products	124.7	138.8	138.4	135.4	119.4
Forest products	126.0	132.3	138.3	154.6	137.5
Metals group	94.5	121.0	141.6	146.3	131.9
Paper and pulp	137.3	150.3	151.8	143.2	147.2
Rubber and its products	174.0	100.0	192.3	172.2	154.1
Shipbuilding	117.0	113.4	121.7	101.9	89.4
Stone, clay and glass	106.4	102.9	140.4	136.3	140.2